Telephony.

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DO SOMETHING.

I am only one, but still I am one. I cannot do everything, but still I can do something. I will not refuse to do the something that I can do.—Edward Everett Hale.

File Your Orders Early.

It behooves operating companies in the telephone field which are likely to require supplies in the near future to place their orders now. TELEPHONY receives reports from all quarters that manufacturers and dealers who cater to the trade are hard pressed to fill orders, and that there is sure to be considerable delay in shipping goods from the necessity of the occasion. The floods in Ohio, Indiana and Illinois, and the cyclones in Nebraska and other states compelled a general demand for poles, cross arms, wires, instruments and many other accessories requiring immediate fulfillment, and the result has been, in most cases, that stocks have been almost wholly depleted. It is said that buyers in the field who hope to obtain their equipment within sixty or ninety days, should get their orders in at once.

This condition, of course, makes for activity in the telephone trade, but it also may lead to disappointment on the part of the manager who is obliged to wait for his supplies. The wise buyer will not hesitate. If, in looking ahead, he sees that he will need wire or poles in the next three months, it will be the part of wisdom for him to send in his order now. Some companies who have ordered cross arms in the last week have been informed that they must wait until a shipment arrives from the Pacific coast. The moral is: *Order now.*

Another feature of the situation is that many buyers are prone to believe that because there has been no demand in their locality for equipment, the same condition exists all over the country, and that prices and shipping facilities are therefore likely to continue favorable. Disasters such as those mentioned, occurring in other parts of the country, are sure to change the whole complexion of the situation, and reverse things entirely. Save yourself trouble, expense and lost time by getting your orders in early.

"Cooperation" the Slogan.

The arrangements for active cooperation between the National Independent Telephone Association and the Telephone Service Association, heretofore agreed upon between special committees appointed by each organization, are now being put into operation. R. H. Holbrook, formerly news editor of TELEPHONY, who will have charge of the special field work for the National association, and F. L. Eldridge, manager of the Service association, have gone East to work up interest in both associations. Entire harmony prevails between the two organizations and an intense spirit is manifest to do everything in the power of each to accomplish things that will be of the greatest practical benefit to all Independent telephone men in the United States.

It is hoped that the efforts to secure the cooperation of all telephone operators, manufacturers and supply dealers will result in a great amount of good for all concerned. It is mutually agreed that there shall be no attempt whatever to favor one organization as against the other, but that both will honestly, sincerely and energetically work for the good of both the National association and the Service association. There is plenty of work of the most effective kind to be done by each along lines that need not conflict in the least.

TELEPHONY urges the companies in all branches of the business to uphold and support both associations. Mr. Holbrook's ability and experience in the Independent industry should prove of marked advantage in extending the usefulness of the National organization, and the good wishes of his many friends accompany him in his new work, both for personal reasons and on account of the cause which he represents.

The Chronic Failure

By HERBERT KAUFMAN

He journeys through life with his head butting into the clouds and his feet dragging through the quagmire. He's a trance medium, a schemer, a visionary, a chaser of the "will-o'-the-wisp." He rushes on without seeing the road, and, like a charging bull, he doesn't know that there's a stone wall ahead of him until he batters himself full of bumps. He's searching for "X"—the great unknown quantity, the twentieth dimension, the secret of the ancients, the magic formula of the alchemist which will change the lead of incompetency into the gold of results.

He deludes himself with the fool idea that he can get wealth without getting down to hard tacks.

He builds weird ladders to the fairyland of his fancy, but the trouble with his ladders is that they have no rungs. He tries to climb up on the steps of theory—and his progress is just as rapid as that of a sprinter who attempts to lower the hundred-yard record on a treadmill.

He's imbued with ideals instead of ideas. His whole career is an endless series of rehearsals which never eventuate into performances. He's all right as far as he goes—but he's short on practical mileage and Fate always kicks him off at a deserted water tank halfway between Start and Finish.

His brain is so jammed with illusions that there isn't room for conclusions. He never learns that a man must buy a full ticket to go the full journey—that he must rear a stairway to the upper stories.

His bridges end in midstream—they never reach the other side. He sets off down the thoroughfare, and before he has fairly started, the first crossroad catches his attention and off he goes, without a moment's consideration as to where he'll land.

He isn't lazy—he's merely hazy. The amount of time and zeal that he fritters away is tremendous—it doesn't count because it isn't concentrated—it escapes in all directions. He's a human teakettle blowing his steam from a dozen spouts—he's filled with force, but he doesn't drive anything with it. He has the power to make things spin, but he doesn't harness it sanely—his driving belt is so loose that when he does hitch it on to the wheel, it immediately slips off.

He's the busiest builder in town, but he shows no results. His foundations are too shallow to hold his walls. And when he does dig them deep enough, his walls are never evened up when he starts in to roof. He's a carpenter without a spirit level and a plumb line—a constructor without a working diagram. He's first cousin to a water bucket with a hole in the bottom—no matter how much energy he pumps into himself, it's wasted.

He's the Chronic Failure—the man with every sense but common sense. He figures only the chances for success, but doesn't contemplate the percentage against him. He doesn't look for the things which are likely to go wrong. He's a bad general—he's content to consider how he can win, but not where he can lose.

He intends to be straight, but he isn't honest to himself, and his self-dishonesty involves everyone whose confidence he gains, and so he seems dishonest to them.

All around him are average men, with fewer natural gifts. They attain and they retain because they take the time to think before they start and to finish what they begin. They don't bother with "X," they know its equivalent—they attempt but one task at a time and carry it out.

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How Does Your Voice Look Sent Over the Telephone?

Description of the Oscillograph by Use of Which the Sound Waves Set Up When a Person Speaks Are Photographed—Instrument Is Used in Telephony to Determine Distortion of Sound Waves During Transmission

By Conda J. Ham

Did you know your voice does not "look" the same to your friend at the other end as it does to the person in the same room with you? Do you know that your voice "looks" different to your friend at the other end if the other end happens to be in some distant city, than it "looks" if it happens to be in your own town? Do you know this can be explained very simply by photography?

The great problem in telephony today is to make the voice look the same from the receiver as it does from the transmitter. When this shall have been accomplished, there will be no need for you to say "Who is this, please?" when your friend calls up for a chat with you. You will know the voice just as you know it when talking face to face.

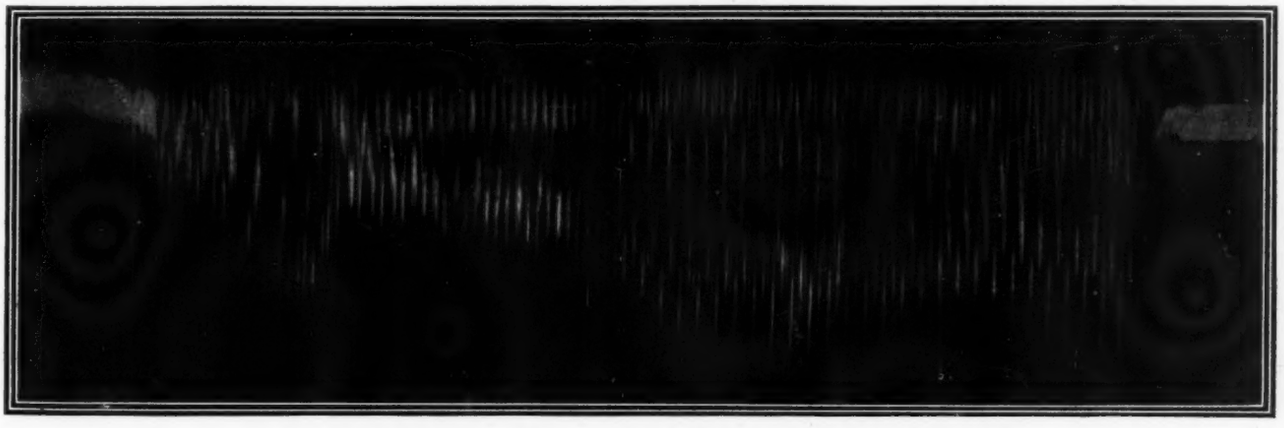
The oscillograph, a somewhat new invention, explains why these things are so. Incidentally it opens ways to new and broader fields, which will be explained later. The oscillograph is a combination telephone, light plant, and camera. The whole instrument is encased in a little mahogany covered box, two feet long, 18 inches high and about ten inches broad. So delicate are the various parts, however, that one of the little instruments cost over $500 to build.

At one side of the little box, a very powerful, yet small arc lamp shoots a beam of light about the size of a common lead pencil against three small prisms. These are so lined up that they refract the beam of light to three small cells filled with oil, located at the rear of the dark interior. The cells look for all the world, like the little glass vials the doctors carry about with them and from which they take the little candy pills when baby has a fever.

Suspended by silver wires in the center of each of these vials, is the thing that changes the sound waves of the voice into the light vibrations which are recorded by the photographic film. It is in fact the smallest part of the whole mechanism, yet the most important. It is a very minute mirror, less than half an inch in length and only about one-tenth of an inch wide. The silver wires by which the little mirror are suspended, are connected to a common telephone into which the words to be photographed are spoken.

The vibration of the transmitter diaphragm causes the silver wires to vibrate in the vials of oil. These in turn vibrate the little mirror back and forth through the beam of light refracted through the prisms from the arc light. The mirror reflects that portion of the beam of light which strikes it, back to the other end of the box through a small slot a half-inch in width. Just on the other side of the slot, the light falls on a highly sensitized photographic film that is being rotated very rapidly and which faithfully records every fitful little jerk of the mirror through the beam of light. The rapidity with which the film rotates is shown by the photograph of the two syllable word, "hello," in which the film rotated through five inches of space in the interval taken to speak the little word. During that time, the little mirror made something like 150 to 200 complete vibrations in the vial of oil.

Experts say that in speaking the word "hello," all the lines pictured below enter the transmitter. But the little intermediate lines seen in the picture gradually drop out. They become neutralized as the vibrations pass along the wire, until by the time the receiving end is reached, only the longer lines, representing the fundamental vibrations of the word, can be "seen." Thus voices "look" and sound much alike by telephone.



Photograph of the Word "Hello," Taken With the Aid of the Oscillograph.

As no two human faces are exactly alike, so, physiologists declare, no two sets of vocal chords are exactly alike. The vocal cords of one person differ in construction, tension, vibration, and control from those of every other human being. In speaking any one word, there are certain fundamental vibrations which must occur to properly pronounce it. Between these fundamental of longer vibrations, however, occur minor vibrations of lesser length and it is in producing these minor vibrations, that voices differ. When, as in passing over a long distance, these intermediate lines are all obliterated, then it is that voices sound the same.

Criminologists may be able to make use of this instrument in the detection of criminals. If no two human voices are exactly alike, then the pictures of words spoken by two different voices would differ in the minor vibrations at least if not in the fundamentals. At the same time it is believed, the pictures of certain words spoken by one

pair of vocal cords, yet at different times, will always be alike.

Here is the methods by which criminals may come to be detected by the simple process of photographing their voices. There will be secreted in some part of the room in which the criminal is taken for examination or questioning, a transmitter resembling, somewhat, the present well known dictograph made famous by the great Burns Detective Agency. This would be connected with the oscillograph in another room. Each office for criminal detection would have some certain code of questions, which would be asked every suspect at a certain point in the examination and which would cause him to utter a definite series of words, or a phrase.

The oscillograph would be operated by a small push button controlled by the sheriff, warden or other official doing the questioning. As the question to which the set answer had to be given is asked, the official could press the button, setting the revolving photographic plate into motion. As the suspect utters the answer, it would be recorded in undying characters on the photographic film. The photograph of the voice of every criminal convicted could be taken before the release from prison and preserved just as measurements, finger prints, pictures, and descriptions are today. Ten, 20, or 40 years later, if the suspect on whom no record could be fastened were caught, he could be asked the same set of questions. He would necessarily give the fatal answer to the catch question just as he had pronounced it when released years before. The official could press the button and again record the phrase; develop the film, and compare it with the original. If they tallied, the suspect's record could then be laid before the jury in plain black and white proofs, and none could deny it.

It looks as if the criminal class had been struck another blow. It looks also as if the little oscillograph would aid in doing away with many of the inconveniences of the telephone, and is doing these things, two great benefits to society will be performed. When all has been accomplished, we will have one more care which we do not have today, and that will be embodied in a new-coined phrase. "How does my voice look?"

Chicago Financier Defends Watered Stock.

In a defense of watered stock as representing the brains of a corporation as distinguished from the actual physical assets, Rufus C. Dawes, Chicago financier, recently declared in an address before the Monday Lunch Club, of the Chicago Telephone Co., that any law tending to curb the issuance of such stock would be a fraud against industry and ability.

He took issue with the statement of President Wilson that concerns which had no watered stock would prosper better than those that had, and urged legislation legalizing the issuance of certificates without par value, which might represent the right to share in profits, but which, by the absence of a stated face value, would be less liable to the abuses of speculation.

Brains Entitled to Share.

"Shall law intervene," said Mr. Dawes, "and say that contributions of brains and industry shall have no stock interest except by paying for it dollar for dollar? This would be a fraud against brains and industry. It would put the dollar above the man. Ever since corporations have been used, brains and industry and money have each had its due recognition, and the issues of stock have been such from the beginning that the par value of stock has had no ascertainable ratio to the actual cash cost of the property acquired. Corporations have been in use long enough to fix firmly in the mind the idea that there is a distinction between par value and actual value, and that the latter, whatever it may be at first, is always changing.

"To announce, and enforce by law, that the cash originally invested in property owned by a stock company must be equal in amount to the stock issued by that company may be a guarantee as to the value of stock before that capital is invested; but after such investment the stock will become worth more or worth less, depending upon whether the enterprise succeeds or fails. Suppose it to fail, and many do fail, then the stock has no value. How could a prospective purchaser of this worthless stock be protected against his impulse to buy upon the assumption that, having been paid in full, it must therefore have value?

Stock Not Measure of Value.

"Everybody who knows what a stock certificate is, knows that it is not a measure of values. He knows it confers a proportionate ownership. To determine its value he must know the total value of the property owned and opportunity controlled by the company, and the total stock issued by that company.

"The other charge against watered stock is that unfair profits are taken in order to pay dividends on it. It would surely be awful to contemplate the earnings required to pay dividends on all watered stock. But has any one noticed that those companies without watered stock, comparatively speaking, are not trying just as earnestly to make money as companies of watered stock are? Every well conducted company ought to use, and does use, every effort within the limits of the civil and moral law to make as much profit for its stockholders as it possibly can."

Offers Remedial Law.

In the event that watered stock should be abolished by law, and the consensus of opinion among our public men, Mr. Dawes said, is that it "must go," he would favor legislation legalizing the issuance of certificates without par value, which might represent the right to share in profits, but which by the absence of a stated face value would be less liable to the abuses of speculation. He concluded urging his hearers to advocate such a law.

No Drift Here Toward Government Telephones.

Until January 1, 1912, the telephone business of England was mostly in the hands of a large private corporation called the National Telephone Co., says the Saturday Evening Post editorially. Some time before that date Parliament decided that the business should be conducted by the government; and so on that date the post office department simply took over the private company's apparatus and trade. Virtually that was all there was to it—the government just took it and proceeded to operate it. Then the question naturally arose, How much should the company be paid? By agreement between the postmaster general and the telephone company that question was presently referred to the Railway and Canal Commissioners as a board of arbitration. There was a hearing, and it was a matter of general comment—as something rather to be wondered at—that this hearing actually took 72 days. The commissioners duly deliberated, and the other day they awarded the company twelve and a half million pounds—it having claimed nearly twenty-one million pounds. Undoubtedly this sum will be handed over, and with that the whole affair will be settled for ever and a day.

In this country there is no drift of opinion toward government ownership of big public utilities. On the contrary, the drift appears to be the other way. For one thing in this country, to adjudicate the price to be paid for the private telephone lines would require not 72 days, but approximately 72 years.

Lessons from the Flood

Its Terrible Losses—What It Teaches Us

By J. C. Kelsey

The winds blew and the rains beat, and the house fell because it was built upon the sand! What a contempt nature must have for the works of man!

It is true we are a little ahead of all other animals—we can even fly. How careless we are—how satisfied we are—how cocksure! Truly, human nature is a queer, undefined thing. With what contempt we bridge a small creek, so harmless in its normal attitude, and with what fury it rises and destroys us! The Rock of Ages is supposed to be the superior limit of perfect security. If we could put an arm about some of the projections of that rock, all the ill humors of nature could not avail against us.

I have gone 160 miles in twelve hours, only to find a great bridge undermined, and being compelled to back up 50 miles and detour about, I have had to draw upon the entire bit of philosophy allotted to me.

A simple creek, with its swirling waters, merely attacked the great stones of the bridge abutments, of which men were so proud, and today they are gnarled, twisted and rent in twain! As a matter of fact, the house was built upon the sands, and it fell!

Young man, go into the bridge business! The bridge companies are the idols of the hour. All the world seeks today—bridges! The losses are tremendous.

The Pennsylvania systems will suffer at least ten million dollars' construction damage. One can not compute the loss in dollars when it comes to lost and delayed traffic. A railroad which earns $1,000,000 every working day of the year is bound to lose greatly by a shutting-down of business.

The trolley companies certainly have their troubles—how they will rebuild is a mystery. Already bonded and over-capitalized, struggling to pay bond interest, and neglecting depreciation reserves, we can almost see the sheriff putting the padlock on the door!

Telephone companies, too, were terribly damaged. But there is a compensating feature. The flood put the telephone on the map!

The public is so accustomed to telegraph wires that they can't imagine getting news any other way. But this time the news came by telephone, and you may be sure that the telephone operators and troublemen were right there, too.

How close is the telephone to our daily lives! A disaster is impending—the news to flee to the hills comes by telephone! A disaster is passing—news hard to get—but the telephone manages to convey to the listening and frightened world that matters could be worse, or that supplies and special relief is needed—news of our beloved ones, etc.

The telephone bids fair to be the most permanent public utility, because it fits so beautifully into human crisis.

What a pity that Edgar Allen Poe did not know about telephone bells as well as "silver bells, brass bells and the loud alarum iron bells!" Some one else will yet write it into our permanent records.

After the flood subsides, after the cyclone passes, we get together and figure its cost.

You know how the public has come into its own—and how the trend of opinion is to lower rates and restrict utilities in so many senses. Railroads can do well at present rates—both passenger and freight—as long as nature smiles or lightly frowns only occasionally. But who is going to provide the $50,000,000 which the railroads lose during such a storm as March gave us? These losses do not come often, yet they come in all-appalling terror. Will the public pay that $50,000,000? Will the governments, both state and national, reimburse the railroads for these losses which they are not allowed to reserve for? Well, hardly!

Will the public reimburse the telephone company which gives them service at fair weather prices, and which will not pay their bad weather losses? It's a poor business enterprise which depends upon fair weather for success. It's a foolish man who does not save a dollar to meet the storms which are bound to envelope him in a life-time. It's a foolish corporation, which, after all, is a group of human beings, that does not save for the bad weather time. Of course, countless public utility concerns would like to save for the rainy day, but they can not do so.

Telephone companies operating $1.50 and $1.00 telephones are only fair weather concerns. You and I should never rest until every vestige of $1.50 and $1.00 telephones is but a disagreeable memory. Let us get on a bad weather basis—in other words, a $2.50 and $1.50 telephone basis. Give no one a telephone under five cents a day. If you do, you are a grasshopper type—a fair weather man, who sings during the sunny season and suffers during the cold, cloudy time.

We must get on the basis of the ant, who works all summer to prepare for the cold and isolation of winter. The public usually responds to the cry for help, and pours money into the destroyed districts. But would it not be better to realize the necessity of getting $4 more out of the public than you do now? That $4 per year will positively carry you through the stresses and strains of ill-humored nature.

Begin today, while the public is still gasping in horror, to do something for that bad weather day. You will never have a better opportunity.

Investment houses usually put forward a claim that telephone companies have little permanency—just poles and wires, and other items of fleeting life. There is no use of bringing forward any argument—we all know that a telephone company has as many pounds of copper as any light or power company in service. And that with fair rates, more money can be earned for a given investment than in any other utility. But, like a railroad, we build a great deal upon the sands. Even our skyscrapers are built upon the sand.

Our poles are necessarily shallow set, and without great strength. We have run down through valleys, crossed bridges and streams, exposed as much as any other utility. We can not hope to escape our share of trouble. In this world, some one or some place is always facing disaster. Why should we be exempt?

In Alaska, a great volcano sprinkled ashes over an area 1,000 miles in radius. Enough dirt or ashes was thrown up to make a cube of 50 miles dimension. It ruined vegetation, killed people and raised Cain generally. We have high water, dry weather, high winds, hunger or something all the time.

I don't see why any one alive today should feel exempt

from disaster. I remember that Omaha people believed cyclones could not strike them on account of adjacent hills. St. Louis once congratulated itself that it was free from cyclones. Yet both cities had fatal ones.

The loss of the steamer Titanic taught the world that there is no unusual safety in great size. The floods have taught us that no detail, however small, and unimportant is likely to be missed.

The principal lesson is to prepare—to be ready, financially—that is the question. This does not mean that a steamship company should only guard itself against financial loss. But it covers the worst evils than can befall a telephone company.

I am awful tired of talking about reserves and depreciation charges. I am now too indolent to discuss its details.

A prominent financial man once said he did not care about details of depreciation, but it was a fine thing to have the money when you needed it. If you have ever hunted for money with your property in the pink of condition, you know how hard it was. They asked you all kinds of questions and wanted you to make all kinds of sacrifices before they loaned you the money.

Now, for Heaven's sake, just ask yourself what money loaners will do when you go to them asking for money and all you have left is good will and a group of franchises? When you were a little fellow you even learned in your Sunday School lesson about the five foolish girls who forgot to put oil in the lamps. Every lesson and every reason tells you to put your house in order!

It is time to strike home—to tell the public that there must be a changed attitude toward the public servants.

The public has gotten into the habit of thinking that trains are run for fun. I wish they could be in my place while I write this!

We have backed up 50 miles with an extra heavy train, to detour around a district covering 150 miles, to carry us the 10 miles which we failed to make because the great bridge was out.

Can you imagine that the Pennsylvania Railroad made any great money on this train? Well, its losses must be fierce! Yet I hear passengers claiming that the road ought to feed them free. Not a bit of sense in such a thing! We surely must share in the risk of encountering acts of God. The railroad is not to blame for its washed out roadway and bridges.

Passengers clamoring for free food are typical of the public. If you gave 50-cent service, the public will some day want it at 25 cents, or some sorehead will organize a mutual company and try to do it free! Just the minute you launch your career as a public servant, you become its enemy and are eagerly sought out to shoot at.

The public has the idea that telephone service is free, or pretty close to it. I don't know why the public has the feeling that telephone people make too much money. Somebody has spoiled them, has coddled them, and has had shaky knees when summoned before their tribunals!

I simply blame telephone people themselves. We have plenty of extenuation, however. We have been in a fight. In a fight, a man does things automatically. He does not always know why he does risky things—he does them without thinking.

When a man is nervous or angry he does not measure results, and sometimes has opportunity to repent at leisure.

Personally, I hope that destructive telephone war will soon be over. Let us hope that conditions will soon deliver us from the expense of war. What is more foolish than selling something cheap to worry the other fellow? And how often human beings do such things!

If the Bell company could eliminate their losing telephones, or if they could get reasonable income from them, they would soon be able to reduce the rates where the charges are now too high.

If Independent companies could get 25 cents more per month all around, we would all be on easy street. It seems to me, after all, that the problems of both Bell and Independent companies are quite simple—a question of 25 cents per month increase in rates!

Likewise the problems of Germany, France and England—and ours, indirectly—could be solved by limiting armaments or going on a peace footing entirely.

If the telephone interests would unanimously feel sure enough of themselves to drop their suspicions of each other's good intentions, we would mark a great advance. Personally, I am sure of our powerful economic position. You may have had individual disappointments and have lost your faith, but closest analysis will show you that you were not and could not be harmed.

The Bell company, naturally, is pledged to eliminate competition. The funny part of it all is that there is a relatively small amount to eliminate. The Bell report shows 2,500,000 connected stations—this leaves 2,000,000 still free from alliance—and possibly not more than 1,500,000 of these are in competition today, while 12 per cent. are in possible duplication.

In other words, I do not believe there are more than 180,000 Bell telephones in the same house or office where Independent telephones exist. This looks foolish—making mountains out of molehills—worrying about 180,000 duplicated telephones.

There is a bigger problem—that of reserves—to meet bad weather conditions. Remember, that in fair weather only do "good fellows hang together." When you are down and out, and in stormy weather, you have no friends! Take a lesson from this Ohio disaster.

You have no special dispensation nor guarantee against the stresses of nature. You are merely human, and you may be called upon to die that others might better live—unless you have heeded the lessons of past experience!

MORAL:—Don't sleep at the switch!

Keystone Statement for March.

The Keystone Telephone Co., of Philadelphia, has issued its statement of earnings and expenses for March and the three months ended March 31. This compares with the previous year, as follows:

REVENUE ACCOUNT.

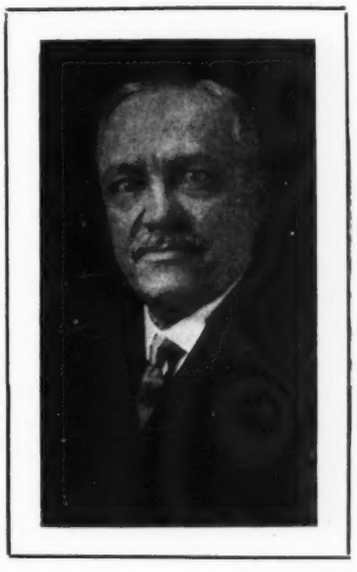
Month of March.	1913	1912
Gross earnings	$103,450	$ 99,300
Operating expenses and taxes	53,565	50,337
Net earnings	$ 49,885	$ 48,963
Less interest charges	25,159	24,999
Net surplus	$ 24,726	$ 23,964
Three Months Ended March 31.		
Gross earnings	$310,363	$294,317
Operating expenses and taxes	158,352	147,745
Net earnings	$152,011	$146,572
Less interest charges	75,937	75,119
Net surplus	$ 76,074	$ 71,453

A Quartet of Men Prominent in the Telephone Field

OTTO TROOST, JR., general manager of the Winona Telephone Co., Winona, Minn., was born in Winona, Aug. 6, 1862. He attended the public school at his home town and graduated from the First State Normal School. After leaving school was weighmaster and shipping clerk at his father's flour mills, later becoming assistant engineer and engineer. When the mills were destroyed by fire, he went into the wholesale business, after which he accepted the position of secretary, treasurer and general manager of the Winona Telephone Co. He became interested in the company in 1894 as a stockholder, later assuming its management, and built it up from a small company to a comprehensive modern system, thoroughly covering its territory. Mr. Troost was one of the first telephone men to go into the building of rural lines. He has served as director in the Southern Minnesota Independent Telephone Association, is a member of the Winona Association of Commerce, Winona Automobile Association, Old Settlers' Association, is an Odd Fellow, and belongs to several other societies.

TRUMAN LEONARD BENEDICT, owner and manager of the Clarendon Telephone Company, Clarendon, Texas, was born in Toledo, Ohio, July 18, 1868. He attended the public schools in Ohio and New York and the high school at Plattsburg, N. Y. After finishing high school he won a life membership to Cornell University, graduating from there in 1892 with the degree of LL. B. He was admitted to the bar, Missouri Supreme Court in the spring of 1902. His first telephone experience was in 1880 when he assisted in building the third telephone exchange in Texas, at Marshall, being 12 years old. In 1901 he was appointed general foreman, telegraph department Colorado & Southern Railway, was afterwards made superintendent of telegraph with headquarters at Denver. Rebuilt the entire telegraph system of this road as well as introducing telephone train dispatching. He left the Colorado & Southern Ry. in 1905, and bought out the telephone plant at Clarendon, Texas, rebuilding the entire system, which covers the county.

EDWARD A. CHENERY, superintendent of telegraph, Missouri Pacific Railway System, with headquarters in St. Louis, Mo., was born aboard ship on the Atlantic Ocean, Oct. 17, 1859. He attended common and grammar school, and entered the railroad business in 1871, was a telegraph operator with the Grand Rapids & Indiana Railroad Co., until 1879. He went with the Southern Pacific Railway, in telegraph and train dispatching department, remaining there until 1886, was appointed secretary to the Union Pacific Railway's general superintendent in 1886. Until May, 1903, he was superintendent of telegraph of the Terminal Railroad Ass'n, leaving this position in 1903 to accept the position of superintendent of telegraph with the Missouri Pacific Railway. In 1895, while superintendent of telegraph of the Terminal Railroad Ass'n., he was instrumental in placing the first P. B. X. in St. Louis, it being in the new St. Louis Union Station. Mr. Chenery belongs to the Association of Railway Telegraph Superintendents, is a 32d degree Mason, Shriner, and a past president of the St. Louis Railway Club.



WILLIAM G. SPAKE, general manager of the Piedmont Telephone & Telegraph Co., Shelby, N. C., was born on a farm in Gaston County, North Carolina, Sept. 30, 1878. He received a common school education in the common district schools of Gaston and Cleveland counties. He entered the telephone business in 1901 as night operator for the Piedmont Telephone & Telegraph Co., later working as lineman. In 1904 was appointed manager of the Cherryville exchange of the above company. In 1907 he was made manager of the entire system and was moved to the home office of the company at Shelby, N. C. Prior to his telephone experience, Mr. Spake was a fireman for two years. He was then a bridge foreman on the Seabord Air Line Railroad Co., after which he became interested with Kendrick Bros. in the manufacture of brick. When Kendrick Bros. went into the telephone business in 1901, organizing the Piedmont Telephone & Telegraph Co., Mr. Spake went with them, working up from night operator in 1901, to general manager of the company in 1907.

Automatic Telephone System To Be Installed In Buffalo

Federal Telephone & Telegraph Co. Adopts Automatic for its Buffalo Exchange Area—Initial Equipment Ordered for 17,000 Lines—Preliminary Plans Contemplate Five Main and Two Branch Offices—Installation to be Completed Before End of Year

The Federal Telephone & Telegraph Co., of Buffalo, N. Y., announces the adoption of the automatic telephone system for its Buffalo exchange and has placed an order with the Automatic Electric Co., of Chicago, for an initial equipment of approximately 17,000 lines.

The Federal company is one of the largest Independent telephone companies in the world. It was first organized 12 years ago as the Frontier Telephone Co., by Buffalo men with Buffalo capital, primarily for the purpose of ending the telephone monopoly then existing in that city, and in this aim it has been eminently successful.

In 1901, when the Independent company entered the field, there were about 6,000 telephone subscribers in Buffalo. The equipment was antiquated, the service poor and the rates high, ranging from five to ten cents per message. Starting with a 5,000-line installation the Federal company's plant in Buffalo has grown to about 22,000 subscribers. The Federal equipment was of the most modern manual type and practically all the main cables were carried in conduits.

As is usual in such cases, the monopoly company began a vigorous campaign to maintain its position and, by reducing rates and improving its plant, succeeded in presenting a formidable competition. For several years the contest was very keen with the advantage first with one and then with the other company. Meanwhile the Federal company was building exchanges throughout Western New York and connecting them with each other and with Buffalo by means of substantially built long distance lines. Gradually it forged ahead until today the Federal company is the predominating telephone influence in Western New York.

The Federal Telephone & Telegraph Co. besides operating its Buffalo system, has exchanges or owns controlling interests in exchanges in the following cities and towns in Western New York and Pennsylvania: Akron, Alden, Angelica, Angola, Arcade, Attica, Avoca, Avon, Batavia, Bath, Belmont, Bolivar, Buffalo, Caledonia, Campbell, Canisteo, Charlotte, Cherry Creek, Clifton Springs, Chocton, Corning, Cortland, Dansville, Dunkirk, E. Aurora, E. Rochester, Enfield, Fairport, Forestville, Franklinville, Gasport, Geneseo, Geneva, Gowanda, Hamburg, Holley, Honeoye Falls, Hornell, Ithaca, LeRoy, Lima, Little Valley, Livonia, Lockport, Middleport, Mecklenburg, Medina, Mt. Morris, Moscow, Naples, Montour Falls, Newfield, Niagara Falls, No. Collins, No. Tonawanda, Orchard Park, Penn Yan, Pittsford, Prattsburg, Pulteney, Rochester, Rush, Rushford, Salamanca, Sayre, Shinglehouse, Silver Creek, So. Dayton, Springville. Warsaw, Watkins. Wayland, Wellsville and Williamsville.

This gives the company a complete service covering the entire Buffalo area, which is a well defined region bounded west and north by the Great Lakes, on the east by the Syracuse zone, and on the south by the Pennsylvania state line.

The total number of subscribers of the Federal and affiliated systems in Western New York is at present more than 65,000.

Besides these telephone affiliations, the Federal company owns the Century Telephone Construction Co., which is one of the large manufacturers of Independent telephone apparatus.

The present officers of the Federal Telephone & Telegraph Co. are: B. G. Hubbell, president; C. L. Ingham, vice-president; J. D. Pugh, treasurer; Hugh Taylor, assistant treasurer; Raymond Bissell, secretary; and G. Barrett Rich, Jr., assistant treasurer.

The board of directors is composed of the following: B. G. Hubbell, Andrew Langdon, Robert H. Hefford, Hardin H. Littell, C. L. Ingham, Walter P. Cook, A. D. Bissell, H. H. Persons, W. H. Andrews, J. B. Wall, C. Mosier, Bert L. Jones, Frederick C. Gratwick, John W. Robinson, Geo. D. Morgan, Chas. Adsit, John Markle, David M. Cowan, Martin Carey.

The company states, that although its manual equipment was designed for the requirements of a large telephone development and its capacity is not yet exhausted, and notwithstanding the fact that the company manufacturers manual apparatus, its officials after more than a year of thorough investigation of all types of equipment on the market, decided to adopt the automatic apparatus manufactured by the Automatic Electric Co., of Chicago, as giving the maximum efficiency and the minimum of expense.

In announcing the change to the automatic, President B. G. Hubbell said in part:

"The Federal company has adopted the automatic apparatus throughout its Buffalo district. This has been done after a test and a series of investigations extending over a period of more than a year, with the results that completely justify the Federal company in offering its own personal guarantee that the automatic will do all the manual system will, and much more.

Our company has adopted it more particularly, however, because of the unamimous approval of the apparatus by a very large number of telephone users who have examined the exhibit in the last two months. Without a single exception the hundreds and thousands of people who have visited this exhibit and who have had explained to them, the marvelous mechanical features and the wonderful convenience of operation and economy of time in the use of it, have expressed their wonder at the completeness of it and have strongly urged the Federal company to adopt it for the use of Buffalo people.

As soon as plans are entirely finished, work will be started and it is hoped that by January next the entire Federal system in Buffalo will be working with automatic apparatus.

No inconvenience will be noticed by the subscriber in making this change. The automatic dial will be attached to the present telephone instrument, and when the plant is fully established, the system will be cut over in a minute's time and the subscriber can make his next call by the automatic.

Buffalo will be interested to know that this change from manual to automatic is in line with the telephone progress of the world and that similar changes are being made in almost every country. In no place, however, has so stupendous a task been attempted as this that has been assumed by the Federal company. A great corps of technical men will be used in making these changes and the attention of the whole telephone world will be centered on Buffalo while this great engineering feat is in progress."

The preliminary plans provide for an installation of five main offices and two branch offices, that is, connecting trunks will be installed from each main office to all of the other main offices, while the branch offices will have trunks only to one of the main offices; connections from the branches being made over the trunks of the main office

in which the branch trunks terminate. The layout is being made for the installation of approximately 17,000 lines in these offices. Additions will be installed in these and other main or branch offices which will be created as conditions require.

The present Buffalo system is operated principally from one office so that the sub-division of the system into a number of offices located in various telephonic centers, the cable capacity will be greatly increased as it will be possible to cut the present cables into the new offices and thus allow them to feed from two directions. By this means the cable capacity of the present system will be almost doubled.

On account of the sub-division of the system, the length of subscribers' lines will be greatly reduced, which will make a marked improvement in the transmission. In no case will subscribers' lines extend over two miles from a central office and the average length of lines will probably be less than one mile.

By this automatic installation, the company states the service will also be improved, particularly in view of the fact that the calling rate of the present system is extremely high, averaging over 20 calls per line per day, a traffic impossible to handle with any degree of efficiency with a manually operated system.

It is proposed to install the outlying branch and main exchanges at the earliest possible moment in order to provide facilities for the immediate demands in those districts, and the present main exchange will be the last to be cut over to automatic. The whole system, however, is to be operating full automatic not later than December, 1913.

When the final plans have been completed for the cut over a more detailed article will be presented to TELEPHONY's readers.

Tri-State Telephone Technical and Social Club's Meeting.

The regular meeting of the Tri-State Telephone Technical and Social Club, of St. Paul, was held last week, there being a large attendance. E. C. Lewis, of Chicago, delivered an illustrated lecture on Automanual telephone practice.

The club members were particularly interested in a schematic drawing showing the adaptation of the Automanual for handling trunked calls in an existing multi-office system. Mr. Lewis stated that it is possible to locate all the trunking on "B" operators at one point. The saving in operating costs is not the only advantage. A marked improvement in service will also result as it is claimed that trunked calls will be handled much more promptly.

A lively discussion followed the lecture, especially relating to that part which referred to the trunking between exchanges. It was brought out that the trunking between some exchanges of the Tri-State company in St. Paul and Minneapolis runs as high as 80 per cent.

A three-round boxing contest concluded the evening's entertainment, after which a buffet lunch was served.

Sale of Illinois Tunnel Property Confirmed.

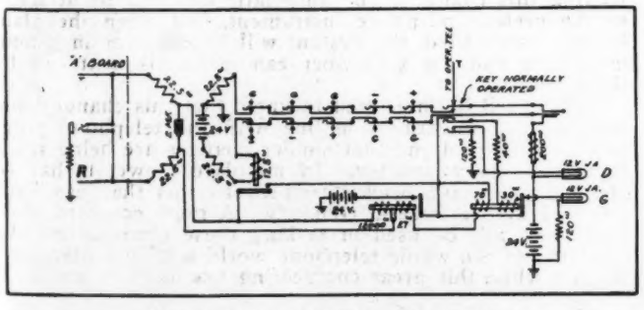
A decree has been filed in the district court, by Federal Judge Kohlsaat, confirming the report of the special master in chancery in the sale of the property of the Illinois Tunnel Co. to the Chicago Tunnel Co., for $5,000,000.

Queries on Theory and Practice

Incoming Trunk Circuit.

"Will you please publish a simplified diagram with an explanation of its operation, of the incoming trunk circuit used with the No. 9 Western Electric switchboard? The circuit is supplied with ordinary alternating, semi-selective ringing."

The inter-office trunk circuit, incoming to the No. 9 Western Electric relay switchboard, is shown in the drawing. The circuit is arranged for operation either on a call wire basis, wherein the distant "A" board operator communicates with the No. 9 "B" operator over a call wire and orders up a connection, or without a call wire, wherein the "B" operator at the No. 9 board uses the listening key shown on the incoming trunk circuit. The operation is



Incoming Inter-Office Trunk Circuit.

the same as any inter-office circuit having disconnect and guard lamps, and is briefly as follows:

When the "A" operator at the distant exchange plugs in, the battery from her cord circuit operates the 108-*B* relay, (12,000-ohms) and lights the guard lamp. Upon the called party answering, the No. 118-*A* relay (12.5-ohms) operates, placing a low resistance path across one side of the repeating coil, thereby giving supervision to the distant "A" operator. This puts out the guard lamp. The operations of ringing, getting the disconnect signal, etc., should be self-evident.

Use of Greek Letters.

"What Greek letters are used in mathematics in the electrical science? Give their names and the quantities they are used to designate."

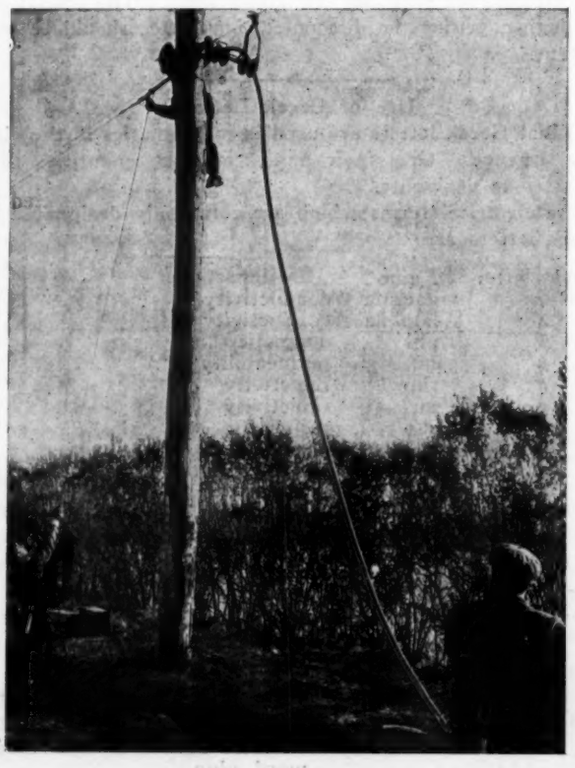
The electrical terms which are commonly designated by Greek letters are:

Greek letter	Name	Designates
γ	gamma	conductivity
λ	lambda	conductivity
Φ	phi	magnetic flux
μ	mu	permeability
ρ	rho	reluctivity
ν	nu	reluctivity
ρ	rho	resistivity
δ	delta	density
η	eta	hysteresis coefficient
κ	kappa	dielectric constant
σ	sigma	leakage coefficient
α	alpha	angle, radian, degree
β	beta	angle, radian, degree
Θ	theta	angle, radian, degree
ω	omega	angle, radian, degree
λ	lambda	angle, radian, degree
ψ	psi	angle, radian, degree
ϕ	theta	angle, phase difference
ψ	psi	angle, phase difference
$\dot{\psi}$	psi	angular velocity in time
η	eta	efficiency
ω	omega	used after figures as symbol for word ohm

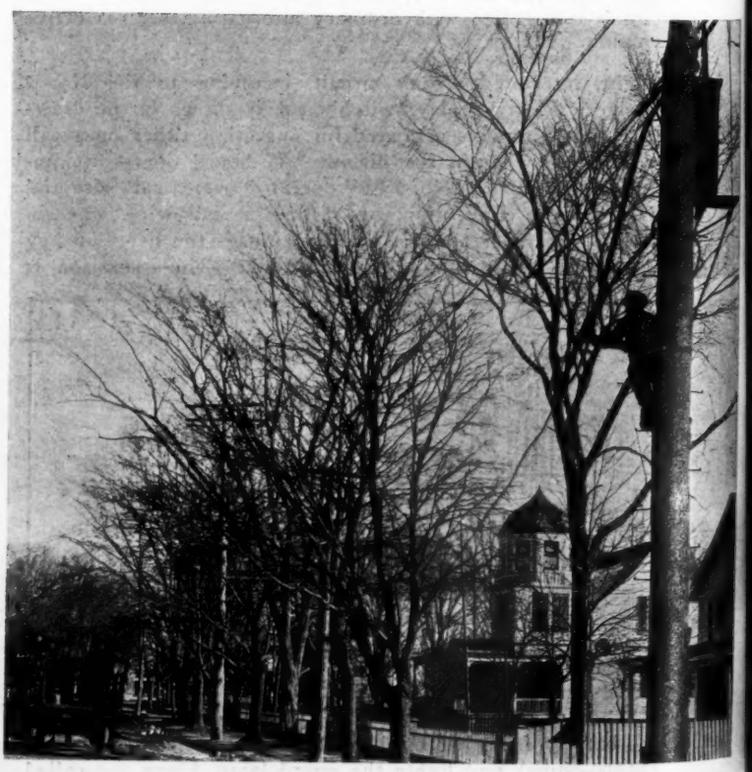
"The Plant Man on the Job"—A Day Spent With the Pl

No. 12. Making Up the End of a Cable for Attachment to the Drawing-in-line.

No. 13. General Set-up of Reels and Apparatus—Aerial Cable Attached for Drawing.



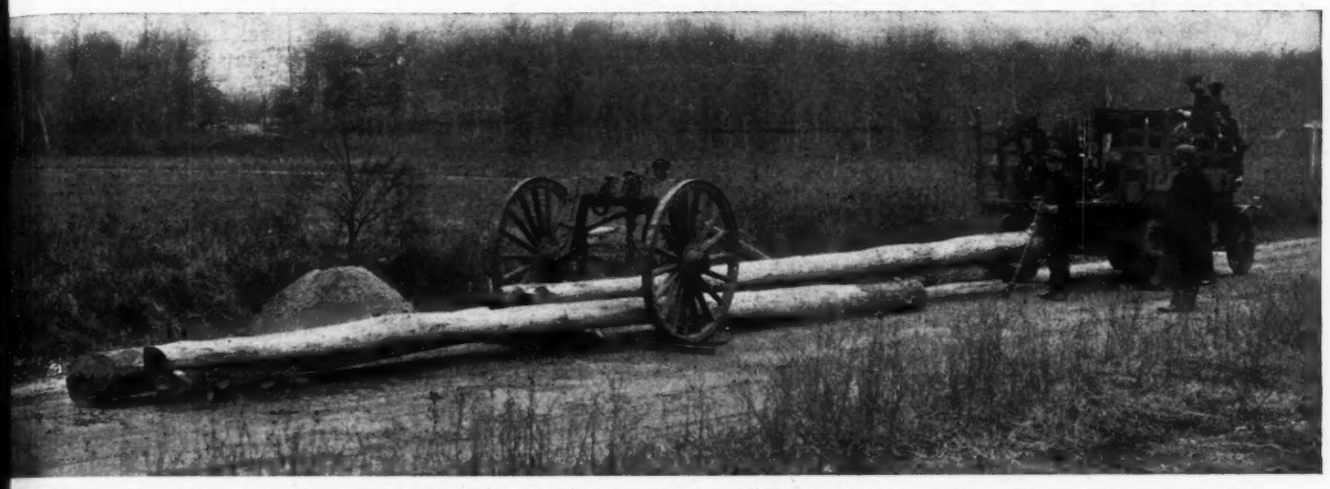
No. 14. Starting the Pull on Aerial Cable.



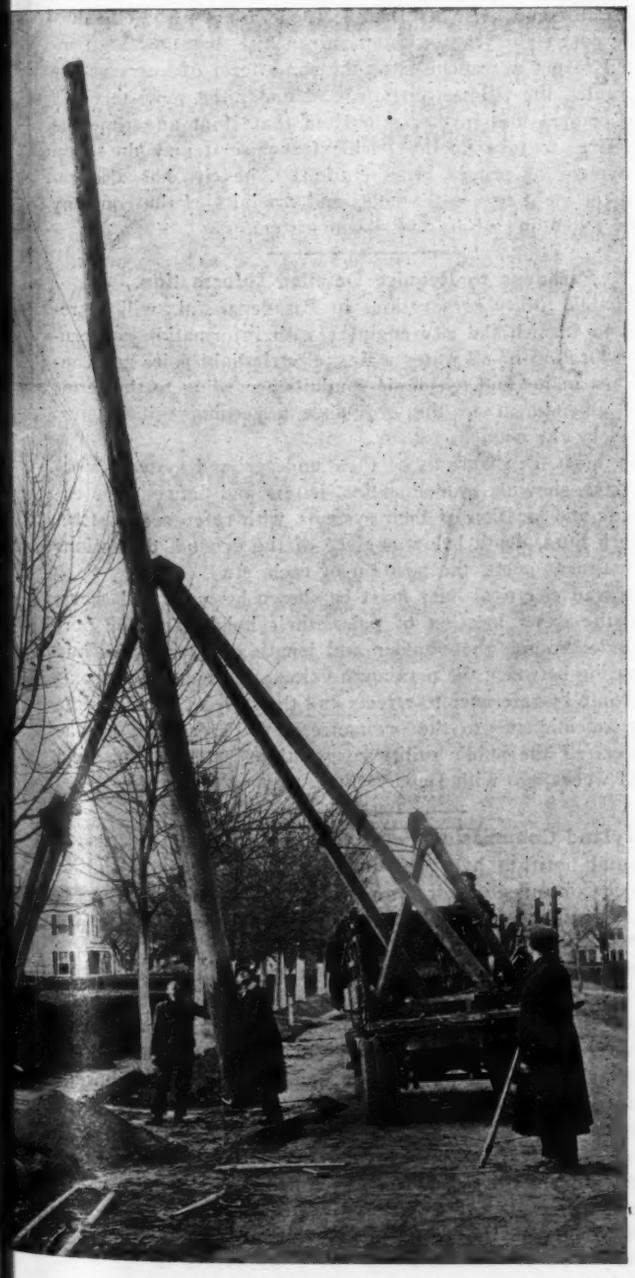
No. 15. The Cable in Position, the Drawing-in-line is Released.

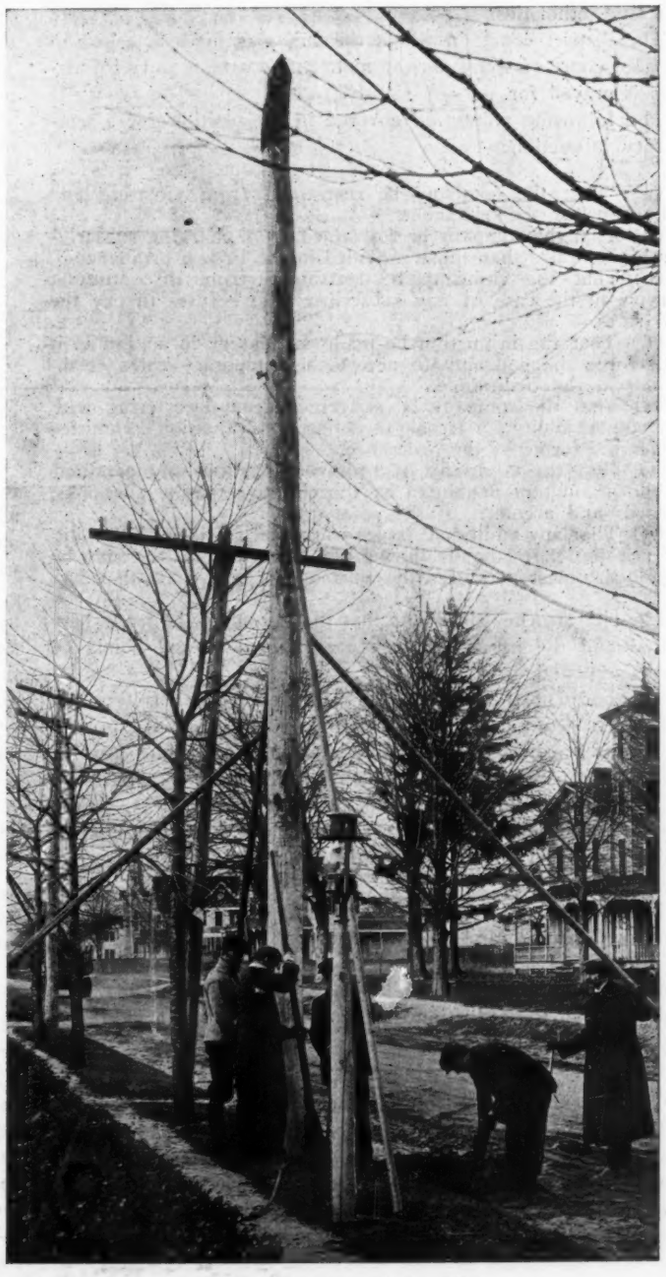
These photographs, which are here shown through the courtesy of

Plapartment on Long Island, Told in Instalments by the Camera



No. 9. First Step in Building an Aerial Cable Line—Motor Truck and Trailer Snaking Poles to Their Respective Places.





Nos. 10 and 11. Erecting Pole with Power Derrick on Motor Truck—Steadying the Big Pole by Pikes.

Review, will be continued in subsequent issues of this paper.

Proceedings Before Commissions, Courts and Councils

Discussions and Rulings of State Bodies Having Supervision of Telephone Companies, Decisions of Courts in Matters Affecting Public Relations of Utilities, and Actions of City Councils Bearing Upon Franchises, Rates and Service

Denver Would Enjoin Bell Company.

City Attorney W. H. Bryant has filed the city of Denver's suit against the Mountain States Telephone & Telegraph Co., asking that the company be enjoined from refusing tenders of the new rates, from discontinuing service to patrons who refuse to pay the old rates, and from further issuance of capital stock or the sale or negotiation of bonds without the consent of the city.

The city attorney makes a new point in the telephone controversy by asking that, irrespective of the legality of the Brown ordinance or of the right of the telephone company to occupy the streets of the city without a franchise all issues of stocks or bonds should be enjoined by the courts and such issues allowed only after full investigation by the court and the city authorities.

The district court, in which the suit was filed, is asked to sit as a court of equity on the matter, and a temporary injunction is prayed for.

The following points are covered in the petition for a temporary injunction:

(a) That the company be restrained from violating any provisions of the ordinance.
(b) That the company be restrained from charging subscribers higher rates than those provided in the Brown ordinance.
(c) That the company be restrained from discontinuing service in the case of any subscriber who refuses to pay the old rates.
(d) That the injunction be made mandatory in so far as it will force the company to accept the temporary rates established in the ordinance.
(e) That the company be restrained from interfering with the mayor, auditor or treasurer, acting as a valuation committee under the terms of the ordinance.
(f) That the company be required to show any certified public accountant appointed by the city to examine all books, records and accounts of the company.
(g) That any additional issues of capital stock or the selling or negotiation of bonds during the pendency of the suit be enjoined, unless permitted by court order, after a full hearing.

The city attorney then asks that the injunction be made perpetual and the injunction in regard to stocks and bonds be made perpetual.

The body of the suit claims that the city has full power over its streets and alleys, power to regulate their use, power to grant franchises and to regulate rates of public utilities whether they are operating under franchise or by sufferance, all under the twentieth amendment. This amendment, claims the city attorney, gives Denver equal powers with the state legislature in so far as the city and county of Denver are concerned.

The advertisement of $2,699,400 worth of stock by the company on March 5, and its announcement on March 24 that all the stock had been subscribed, is cited as a reason why the court should enjoin further issuance of stock, as this will make difficult the reduction of valuation by putting a figure on physical valuation.

California Commission Fires Rates.

The Raymond Telephone Co., of Raymond, Cal., has been granted permission by the Public Service Commission to put into effect a monthly rental charge for service between Raymond and The Pines, as follows: Residence telephone, $1.50 per month; business telephone, $2 per month. The company has also been authorized to close its central office at Coarse Gold.

Rescinds Action Abolishing Franchise.

The City council of Venice, Cal., at a recent meeting, restored the franchise of the Santa Monica Bay Home Telephone Co. Some time since the same body instructed the city clerk to advertise the franchise for sale, as the company had failed to pay into the city 2 per cent. of its gross earnings, as the franchise called for.

This was not done, as it was expected that a merger would be effected with the Pacific (Bell) Telephone & Telegraph Co. The local company was not anxious to have this consummated, and informed the council on several occasions that it stood ready to pay into the city the 2 per cent. but that the action of the council had been so hastily accomplished that the time to do so was not given them.

The Bell company, which has been operating in the city during the past eight years without a franchise, has now been instructed to get a franchise for the same term of years as the one granted the Home company, and under the same terms.

The council has further stipulated that if at any time the city desires to take up the Pacific franchise it may do so on the payment of proper remuneration. The city has also reserved the right to use the poles and conduits of the company for the extending of its fire alarm system.

Pasadena to Require Detailed Information.

All public utility corporations in Pasadena, Cal., will be required to furnish the city engineer with information concerning the location of all water mains, electric light poles and conduits, gas mains and telephone conduits according to the terms of an amendment to the ordinance governing utilities just adopted by the council.

They must file diagrams of their underground systems within 90 days, showing by delineation, letters and figures, the exact route and location of their systems, with reference to street and curb lines, depth below surface of the ground, dimensions of constituent parts, the position of each, etc.

Overhead electrical lines must be shown by maps and charts giving the exact location of poles, their height and the portion underground, the number and length of cross arms and the spacing between, the maximum voltage carried, the approximate route by reference to streets and the style of construction.

The amendments to the ordinance were determined by the managers of the public utility corporations at a meeting held several weeks ago with Deputy City Attorney Howard.

Maryland Commission Petitioned to Reopen Rate Case.

Formal petition has been made to the Maryland Public Service Commission for reopening the ratemaking investigation into the Chesapeake & Potomac Telephone Co. by the Protective Telephone Association.

The commission is asked to make a valuation of the property of the Chesapeake & Potomac company, independent of the appraisal returned to the commission by the company. This was not done in the first investigation. It is also asked to make an expert examination of the books and accounts of the company in order to ascertain the exact facts as to gross and net earnings, operating expenses, cost of construction, depreciation and maintenance charges, and, upon facts thus developed, to determine rates for telephone service which shall be fair.

It is alleged in the petition, as evidence of the telephone company's unfair treatment of the commission in the first

investigation, that it paid its parent company, the American Telephone & Telegraph Co., $67,000 annually at the time for royalties, and concealed the payment in operating expenses, etc.

This payment, it is claimed, is actually a dividend payment. The effect of the alleged concealment is said to be an increase of dividends to the parent company above those contemplated by the commission.

Baltimore Council to Probe Bell Company.

The Baltimore city council has adopted a resolution requesting the city solicitor to investigate the present service and charges of the Chesapeake & Potomac Telephone Co.

The resolution charges that the recent decision of the Public Service Commission did not provide the relief sought by the general public and that the company has not complied with the ruling of the commission that the charges for meter service should not exceed $3 a year. It also states that there still exists a strong public sentiment in favor of a further investigation of the telephone company.

Dakota Central Secures Temporary Injunction.

The Dakota Central Telephone Co., which is engaged in a franchise controversy with the city of Mitchell, S. D., has secured a temporary injunction restraining the city from interfering with its property. The company's refusal to accept a franchise offered it by the city resulted in the authorities ordering it off the streets.

The situation at Lemmon is somewhat similar to that at Mitchell. The Lemmon City Council recently ordered the company to remove its wires, cables, poles and all other telephone material from the streets and alleys and the citizens were requested to disconnect their telephones not later May 11 next, when the franchise of the telephone company terminates.

The company has refused to accept a new telephone ordinance setting forth the conditions on which a new franchise will be granted.

Central District Company Changes Name.

The Central District Printing & Telegraph Co., of Pennsylvania, has changed its name and will be known, hereafter, as the Central District Telephone Co. The company was organized two years prior to the invention of the telephone, and at which time printing telegraph service was extensively employed. The new name will be more suitable and convenient, as it more closely identifies the company with the service it has rendered for many years.

Franchise of Napoleon Company Revoked.

The franchise of the Napoleon Telephone Co., of Napoleon, Ohio, was recently revoked by the city council, following a controversy over rates and service. The company, it is reported, will begin suit to enjoin the city from taking any action under the ordinance.

Iowa Commission to Supervise Telephone Companies.

All telegraph and telephone companies operating in Iowa are declared to be common carriers and are placed under the control of the railroad commissioners, by the Elwood bill, which recently passed the house.

The measure requires that a telegraph company must accept for transmission a message directed to a point reached by another line, and turn it over to the competing line to make the delivery. This will put an end to the practice of telephoning telegrams from the nearest point reached by the company accepting the message.

It stipulates that the railroad commissioners shall be given general supervision of all telegraph and telephone companies. The commissioners are ordered to inquire into any unjust discrimination, neglect or violation of the laws, and are ordered to prepare for telegraph and telephone companies, as soon as practicable a schedule of reasonable maximum rates.

The board is given authority to compel two or more telegraph companies competing at any point to make suitable connection so as to afford the most direct and expedious communication by telegraph and telephone between different communities.

The measure provides, however, that the power of the commission to fix rates shall not apply to rural telephone companies doing business on the co-operative or mutual plan, except for joint rates with connecting lines.

Rulings of South Dakota Commission.

The South Dakota Railway Commission at a recent meeting ordered all toll line companies in the state to prepare inventories and plats of their lines to be filed with the board.

The Menno exchange was authorized to increase its rates on business telephones; the Union company, of Hartford, was given permission to charge $1.25 for monthly rental with a 25-cent discount if paid in advance.

The Dakota Central company filed a schedule of rates at Mitchell, and has been asked to supply the board with a complete inventory of the plant, and a plat of the town showing the location of its lines.

The Canistota company, and the Conde company both filed application to increase rentals, and have been instructed to file plats with the board.

Wisconsin Assembly Postpones Action on Minkley Bill.

The legislature of Wisconsin had indefinitely postponed taking action on the Minkley bill which provided that cities may establish municipal telephone systems without first obtaining a certificate of public convenience and necessity from the Railroad Commission. Assemblyman Minkley argued that ultimately the state and federal governments would own and operate the telephone systems of the country, and he thought this right should be given the municipality to make a start. The committee took the position that, if the municipality desired to enter the telephone field, the existing systems should be purchased at a price to be fixed by the Railroad Commission. That right the cities now have under the public utility law.

Michigan House Favors State Ownership.

The special telephone committee of the Michigan house recently submitted a report in favor of having measures taken so that the state can eventually own all the telephone service in its boundaries; also that, until state ownership comes about, counties and districts be allowed to determine by a referendum vote whether or not they want a new telephone system. The report contains schedules of rates for all parts of the state.

The house committee on private corporations also favorably reported the administration bill for the thorough regulation and control of telephone rates and service by the Railroad Commission, the commission to be empowered to approve or reject applications to build a new and competing system.

Judgment Against Louisville Company Suspended.

The judgment enjoining the Louisville Home Telephone Co., of Louisville, Ky., from maintaining party lines now in use, in accordance with the decision of the court of appeals, will not be enforced until July 1, 1913. An order of suspension of the judgment was entered recently and Judge Kirby granted the extension of time.

A Mexican Operator Greets Her Sisters in the "States."

This charming young lady is an operator in one of the Mexican exchanges described by Mr. Forbes in his article in last week's TELEPHONY. She was unfortunately, crowded out because space was limited. Mr. Forbes, in his letter

A Typical Mexican Switchboard Operator.

to this paper, says that she is a typical operator and, it must be admitted at once, she appears to be sufficiently intelligent and attractive to capably fill even that exacting position.

Michigan Commission Authorities New Stock.

The Michigan Railroad Commission has authorized the issue of $18,000 additional capital stock by the Mutual Telephone Co., of Lapeer, Mich.

Report of the Cuyahoga Telephone Co.

The annual report of the Cuyahoga Telephone Co., of Cleveland, O., for the year ending December 31, 1912, has just been issued.

The financial statement is as follows:

RESOURCES.

Property and plant	$6,021,785.53
Engineer's estimates—uncompleted	5,507.14
Current assets	154,471.28
Deferred assets	10,459.21
	$6,192,313.16

LIABILITIES.

Capital stock—common	$1,500,000.00
Capital stock—preferred	1,437,350,000
Bonded debt (outstanding)	2,708,000.00
Collateral trust notes	237,100.00
Current liabilities	116,099.84
Deferred accounts	80.91
Reserve accounts	112,215.49
Surplus	81,466.92
	$6,192,313.16

The comparative statement of income and expenses for the years 1911 and 1912 is:

INCOME.

	1912	1911	Increase *Decrease
Rentals—telephone	$766,759.19	$760,005.98	$ 6,753.21
Toll Service—long distance.	12,461.43	11,876.61	584.82
Toll Service—suburban	6,685.39	6,642.64	42.75
Toll Service—pay stations.	65,061.46	59,191.10	5,870.36
Rentals—electric building.	75,850.07	75,119.87	730.20
Miscellaneous	3,941.47	4,242.17	*300.70
Gross income	$930,759.01	$917,078.37	$ 13,680.64

EXPENSES.

Service	$136,267.59	$122,163.11	$ 14,104.48
Maintenance	144,820.97	142,687.45	2,133.52
General	90,196.23	95,202.58	*5,006.35
Taxes	62,454.70	57,468.90	4,985.80
Electric building	48,739.62	46,200.14	2,539.48
Bad and doubtful debts	9,964.06	14,858.96	*4,894.90
Leased right of way lines and contracts	2,586.96	2,811.83	*224.87
Miscellaneous	2,456.93	3,182.58	*725.65
Total expenses	$497,487.06	484,575.55	$ 12,911.51

SURPLUS.

Gross income	$930,759.01	$917,078.37	$ 13,680.64
Total expenses	497,487.06	484,575.55	12,911.51
Net income	$433,271.95	$432,502.82	$ 769.13
Reserves	$ 10,000.00	$ 3,500.00	$ 6,500.00
Depreciation	149,712.10	152,111.93	*2,399.83
Total net income	$273,559.85	$276,890.89	$ *3,331.04
Interest on mortgage bonds	$135,400.00	$135,400.00	.....
Interest on collateral trust notes	16,589.29	23,760.00	$ *7,170.71
Discount on collateral trust notes	2,772.00	3,960.00	*1,188.00
Dividend on preferred stock	86,241.00	86,241.00	.....
Total	$241,002.29	$249,361.00	$ *8,358.71
Surplus	$ 32,557.56	$ 27,529.89	$ 5,027.67

The reports are certified by C. F. Haskins, auditor, as being correct and truly representing the transactions for the period named.

The officers of the company are: Chas. A. Otis, president; C. Y. McVey, vice-president and general manager; H. O. Leinard, secretary and treasurer.

The board of directors is made up of Chas. A. Otis, C. Y. McVey, E. G. Tillotson, M. C. Harvey, F. H. McKnight, H. G. Dalton, Harry Coulby, N. C. McLoud, W. B. Whiting, F. A. Davis and Frederick W. Stevens.

Kentucky Asks Physical Connection.

The Kentucky Railroad Commission recently heard the complaint of the Campbellsville Telephone Co., of Campbellsville, Ky., against the Cumberland Telephone & Telegraph Co. The plaintiff is asking for a physical connection with the Cumberland Company, so that its subscribers may use the latter's long distance lines.

Independent Company Secures Over 2,000 New Subscribers.

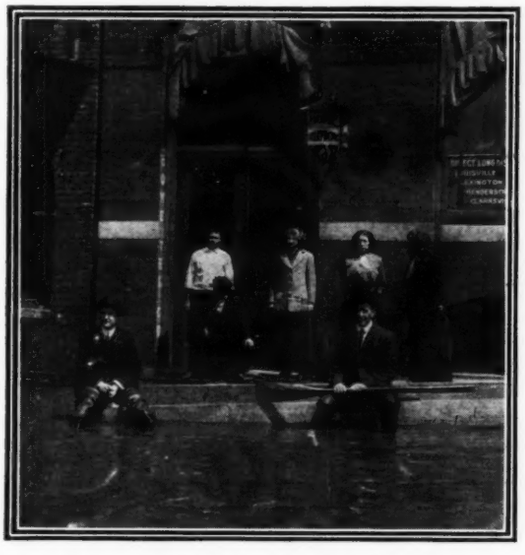
The campaign recently inaugurated by the board of trade, of New Castle, Pa., to secure 1,500 new subscribers for the Union Telephone Co. has been very successful, the list aggregating over 2,000.

Practical Subjects—Letters and Discussions

The Flood at Paducah, Kentucky.

As a matter of possible interest to TELEPHONY's readers, am enclosing picture of our Paducah office during the recent flood showing H. J. Jeffery district manager, and C. P. Short, local manager, on the front steps in a "John" boat.

We slept and fed the operators in the building for more than a week. The power and lighting companies were



A "John" Boat Was Used in Paducah.

forced to shut down and in order to get power to charge batteries the Ford runabout trouble machine was dismantled and the engine rigged up to run the generator. Notwithstanding the fact that all underground conduits and manholes were flooded to a depth of several feet, and it was necessary to move several hundred telephones to the second floors, we gave service all through the time of high water with less than 200 cases of trouble.

Louisville, Ky. S. M. Heller, General Manager,
Central Home Telephone & Telegraph Co.

Uncle Henry Writes About Anchors.

I have noted with a good deal of interest, the article published on page 35 of TELEPHONY of March 22. It seems to me that you are to be congratulated on having a contributor with the moral courage to place himself in a defensive position on the question of using patented anchors by speaking so frankly as he did in his article entitled "Predetermination Versus Demonstration."

The writer is an "Old Timer" in the construction game. At one time he was thoroughly disgusted with all patented anchors. This was largely due to the fact that the linemen were prejudiced in favor of the log anchor and had no faith in the holding power of any patent anchor. They insisted on the use of log anchors because they said, "When we dig a hole and place a log in the ground, we know it is safe for us to trust our lives on the poles, when you are bowing your wires up in the middle."

In the belief that he would secure better results by getting the men to become enthusiastic in the doing of their work, the writer disregarded the excessive cost of the log anchor installations. He was not thoroughly satisfied that he was doing the right thing and for this reason kept a careful record of the performance of the log anchor. Like your Uncle Dick in his letter to Ben in the March 22, issue, he found on examination under the ground, some things that should have been placed in the Museum of Fine Arts, if the museum only had a place called the "Shirkers' Department."

In spite of rigid specifications as to the best method of installing log anchors; in spite of absolute confidence in the foremen in charge of the work, much to the writer's surprise, he found that some of these log anchors were not installed the proper depth in the ground. In at least two instances the rod was bent around the log like a hook which made the rod appear at the surface as though the anchor was down at the proper depth. This was not discovered until ultimate strain was placed on the line, at which time the poles came over. This caused an investigation to be made and the "Shirkers" work was laid bare.

In three other cases that I discovered, the ingenious shirker, hating to dig, had evidently found an accommodating blacksmith, who had cut the rods off, and rethreaded them for his friend, the shirker. These log anchors were, of course, installed too shallow. They saved the men who put them in, a lot of work. But when the ultimate strain came on, it cost the company a lot of money to reanchor the poles. The writer has also found cases like those described by "Uncle Dick" where the man drove the rods through the logs into the soft earth underneath. This is the simplest way of all, as it required the least labor. Of course, it is only feasible where the anchors are installed some time before it is attempted to place any strain on them, because as soon as the men start to pull strain with them, the rods pull right out to the log again. This kind of work is usually done by a man who is going to "blow" the job before this happens.

In several cases that came under my investigation, it was found that the threads on the rods had been damaged and the nut could not be placed on the rod properly. However, they did manage to get a half thread on and later because of corrosion and rust, the ultimate strain caused it to let go and the line went over.

Another thing that the writer found as a result of these careful investigations and his 17 years' experience in the construction game, may be a surprise to many of the readers of this letter, but he is satisfied that any construction man who will look into the matter will find the same. That is: where a hole is dug in the ground and refilled, the soil becomes very much more fertile at this spot. Where clover and timothy hay formerly grew prior to the digging of the hole, it will be succeeded at this place by a fine crop of pig weed. The writer insisted on galvanized rods, but could not understand why the galvanizing did not retain a reasonable life. Investigation showed that many of the rods corroded and really showed very little more lasting qualities than ordinary black painted rods. Careful examination and analysis of many cases brought about the following startling conclusions:

The disturbance of the earth above the anchor because of the necessity of digging a hole, increased its fertility just as the field is made more fertile by the farmer when he plows it. This caused a healthy crop of pig weeds to grow around the anchor rods. These weeds prevented the ground from drying out as rapidly as it otherwise would. The rods being installed near a railroad or in smoky cities, the smoke from locomotives and factories constantly deposited sulphuretted hydrogen, which combined with the moist and decayed vegetation around the anchor rods and produced a dilute sulphuric acid. The acidulated water in

the course of a few years would cause the rod to become so badly corroded that renewal costs seemed to the writer to be unnecessarily high.

It was because of this corrosion and because of the shirkers previously mentioned that he decided to try to use as much as possible and within their limit, some form of the many patented anchors that were on the market. After careful thought and looking at the question from all angles, it was decided that we would not consider any of the anchors which had to be inserted in a hole.

This brought me down to a choice between two anchors, the type that is driven into the ground and the one that is screwed into the ground. None of these have the objections that exist in all the others and the log anchors.

For strains heavier than 7,000 pounds, we will not use any patented anchor, because with a 50 per cent. factor of safety, we do not consider them safe. We use logs and frequently supplement these by a liberal use of concrete. One of our regulations now is to have a responsible inspector present during the installation of log anchors.

These safeguards were adopted by my company seven years ago and they have used thousands of the screw in type anchors and many hundred of the drive anchors in the rocky soils. So far they have never had one of them fail. As they can be inspected accurately from the top of the ground, the shirker has left our line crews.

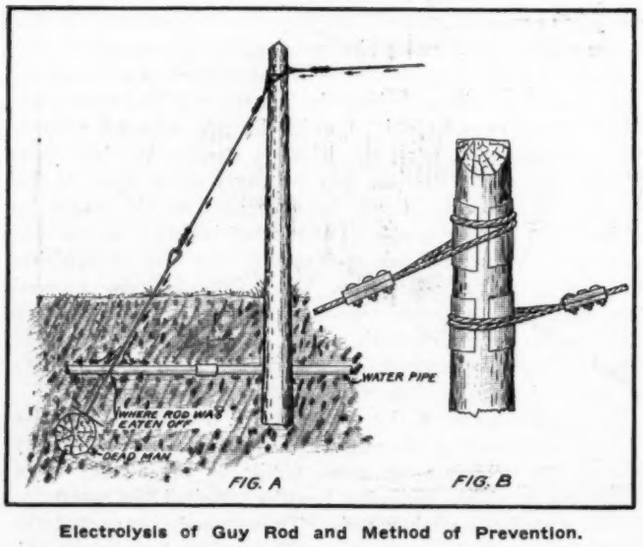
Uncle Henry.

An Uncommon Case of Electrolysis.

We recently had a very interesting case of electrolysis and I think TELEPHONY's readers may be interested to learn of it.

All of the wires of a heavy lead becoming slack, the down guy holding the lead was examined and it was found that the anchor rod had given away. It was a 1½ inch rod about seven years old and should have held. On digging down we found the rod had been corroded by electrolysis between the rod and a water pipe. The water pipe was about three feet from the anchor rod and the rod had been eaten away by current flowing from the guy strand as shown in Fig. A.

The dead man was dug up and a new rod put in. To



Electrolysis of Guy Rod and Method of Prevention.

prevent a repetition of the same trouble, the down guy was placed on a separate pole shim from the guy ahead. The shims for the two strands were placed about three inches apart as shown in Fig. B, thus insulating the down guy from the strand on the cable pole.

Inasmuch as current cannot get to the down guy, we do not think the water pipe will bother us any more.

Illinois. A Reader.

False Busy Test on Incoming Trunk Lines.

The following case of trouble on the incoming trunk board of a large common battery office was an interesting one. The relays for the trunks are located on the rear of the switchboard and their operating current returns to the

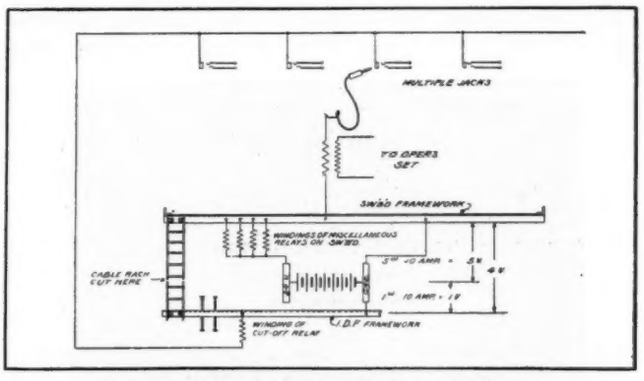


Diagram Showing False Busy Test Conditions.

grounded side of the battery through the switchboard framework. This framework is connected to the battery by a heavy copper wire, but more directly, as shown in the sketch, by the cable rack to the main and intermediate frames.

During some alterations to the cable layout, the rack was cut off near the trunk boards and instantly the operators on this board reported a false busy test on all lines. The foreman soon decided that the cut in the rack was the cause of the trouble and ordered the ends of rack to be cleaned and connected by heavy wire. The false busy test disappeared at once, and no further trouble was experienced.

The explanation of the trouble will be apparent by reference to the diagram. The operator will get a busy test click when there is a momentary flow of current through the primary winding of the induction coil. It is due to a difference in potential between the relay rack and switchboard frameworks. If the cable rack framework between these two is cut as shown in the sketch, then the fall of potential from the switchboard framework to ground will be much greater than that from the relay rack to ground. Hence they are connected through the induction coil, plug, sleeve, and cut-off relay winding and a current will flow thus giving the operator a "busy" click.

Paul B. Findley,

Quick Care Taken of Trouble in Atlanta.

In its April supplement to the directory, issued by the Atlanta (Ga.) Telephone & Telegraph Co., under the title "The Atlanta 'Phone Register," the following statement is made as to quick handling of trouble by that corporation:

"The recent severe storm troubles were handled rapidly and efficiently by our trouble department. Poles were down, trees had fallen against the wires; quick action was essential. Most of the trouble was adjusted within a few hours, and inside of 48 hours practically every isolated case of trouble had been taken care of."

Central Illinois Association Incorporates.

The Independent Telephone Association, of Central Illinois, with headquarters at Decatur, has been granted a charter by the secretary of state at Springfield. The organization is to protect mutual interests. The incorporators are Oscar Yarnell, J. W. Collins and B. E. Converse.

Sparks from the Troubleman's Department

The Manager.

By E. T. Teece.

Who is it that's cussed when things go wrong,
When collections are short and expenses long,
When the service is poor and lines are bad
And the help is peeved and subscribers mad?
The manager.

Who is it that's blamed when the girl is slow,
When she sasses subscribers and talks to her beau;
When 'phones go dead and the lines are punk
And the plant is called a lot of junk?
The manager.

Who is it that has to stand the gaff,
Of biting jest and unkind chaff
From richman, poorman, beggarman, thief,
From operator, lineman and wire chief?
The manager.

Who is it that always has to smile,
Must never be cross and must dress in style
Who must tell a thief he's an honest gent
Who must take what he gets and be content?
The manager.

Who is it that's always expected to
Soothe the temper of Gentile and Jew;
Who must swallow his pride and be meek and low
Who must laugh at bad jokes though he cry at their woe?
The manager.

But, who is this one on the last great day
Among the saints on the golden way,
Who will laugh and smile and gleefully grin
As he watches the kickers told where to head in?
The manager.

Made Hello Girl "Woozy."

One of the hello girls at the Greene county exchange came close to getting hypnotized by the "induction" method last evening, says an Iowa daily paper. Gilpin, the hypnotist at the opera house this week, was exercising his powers by telephone over somebody at Iowa Falls. "You will sleep for 50 hours" said Gilpin, "without food or drink. Sleep, sleep, sleep."

At this point the Iowa Falls party fell off his stool, and the girl here in Jefferson, who had been told that she might "rubber," became the victim of a "woozy" desire to go to sleep also, but was rescued by her companions just in time to avoid a fifty-hour slumber.

The young lady is unable to account for her unconquerable desire to drift into dreamland, but states that it was the real thing, and she couldn't help it. The fellow at the other end of the line is wrapped in the arms of Morpheus in an Iowa Falls show window.

Telephone Replacing Polite Correspondence.

In an article on "Telephone Courtesy," in the Woman's Home Companion, the author tells a story of the passing of the "old-fashioned" note. She says:

Mrs. Palmer, pencil in hand, studied the rough diagram of her dinner table. It was to be a dinner in honor of the new rector of their church, and rather formal.

"If I send Margaret Norman out with Mr. Wilbur, they will talk the new library from soup to coffee, and ignore every one else. I think it had better be Betty Henderson. By the way—"

Mrs. Palmer turned over a little heap of cards and notes.

"I haven't heard from Betty. I wonder if she is coming."

Mr. Palmer started guiltily and cleared his throat apologetically.

"Speaking of Betty Henderson? Why, I forgot to tell you, dear, that she phoned last evening while you were out. Said she hadn't time to write—was in town for a few hours only. The Merces have a new six-cylinder car, and they're taking her to Summitville for the week-end, and—"

Mrs. Palmer tapped the desk with her pencil.

"What I wanted to know, Henry, is whether she accepted or declined my invitation."

"Bless my soul, Mary, I can't recall! Oh, yes, she's coming. I remember now, because she said that if the car did happen to break down she could take a trolley."

"She had time to talk automobile with you, but not to write an acceptance," commented Mrs. Palmer severely.

Her daughter glanced up from her embroidery.

"Mother, dear, nobody writes notes in this day of the get-there-quick-telephone. More than half my invitations come over the wire."

Which is why the average hostess wastes time figuring on the number of her guests. Telephone messages are not delivered; or the guest forgets to make a note of her acceptance, and finds herself face to face with two engagements for the same evening. A woman's desk and pen mean little to her in this day. The telephone is responsible for the passing of polite correspondence.

TELEPHONY'S BASE BALL TERMS.

A Common Return.

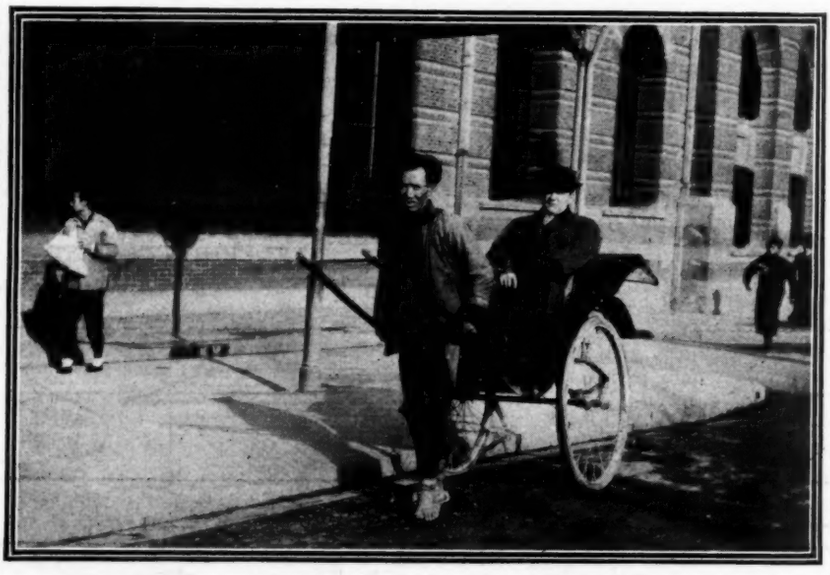
The "Nudeinart."

"I'm so sensitive," said a perfectly ladylike lineman the other day, "that I can't associate with a bare wire, if alive, without being shocked." And far off across the meadows was heard the voice of the cuckoo, calling to its mate.

Out of the Mail Bag

"I am sorry," writes a subscriber in Iowa, "that your installments of 'The Telephone Inspector and the Troubleman,' and Mr. Van Deventer's serial are not longer. Just as I get interested, I turn the page, and run across the line 'To be Continued.' I know that TELEPHONY has to print so much matter every week, and that there has to be variety. Are the Dobbs' articles to be collected in book form at a later date? I consider them, the Van Deventer articles, Kelsey's weekly essay and 'Uncle Dick's' practical letters the best features of your publication, which has been of great value to me, as I know it must be to every telephone man."

Readers of popular magazines need not be reminded that in order to keep the subscriber in suspense, and insure his buying the next issue, the current installment of a serial usually ends just when the hero is hanging over a precipice in dire peril of his life, or when the heroine is about to leap from the seventh floor window of a burning building. It is not TELEPHONY's desire to tantalize its readers by chopping off an installment at such a point, but the exigencies of the case makes it necessary to stop somewhere, and it is more than difficult to choose a place in a serial, where it is all interesting. Replying to our Iowa friend's query, it is probable that "The Inspector and the Troubleman" will be republished in book form, as many requests have been made for such a volume. This revised series should make a valuable addition to any telephone man's library.



He Found Transportation in Shanghai, China, Different from in Chicago.

The editor is glad to announce that on the conclusion of "The Inspector and the Troubleman," TELEPHONY will begin the publication of a new serial by the author of the "Uncle Dick" practical letters which will be one of the most interesting and instructive features ever printed on telephone topics. The articles will tell the practical experiences of the manager of a company in a typical American town who starts in with a rundown plant and places it on a paying basis. Every phase of telephone work is dealt with, and as the writer has had a wide and varied experience in every branch of the industry, and tells his story in a delightfully entertaining style, TELEPHONY subscribers are certain to enjoy this new serial. Not only the practical operation of a telephone plant, under every condition, but the relation of the company to its employes and to the public as well, will be discussed in a manner that is sure to be helpful to the reader. We believe the new serial will prove as fascinating as a Zenda story.

J. C. Murray, of the Kellogg Switchboard & Supply Co., has been in China several months, handling the affairs of that company, and in a letter to TELEPHONY encloses a photograph, which is reproduced on this page. Mr. Murray is seen seated in a man-propelled taxicab such as is common in Shanghai, whence he writes as follows:

"Have received TELEPHONY regularly during my stay in China, and it certainly has been a welcome sight to me. The Shanghai Mutual Telephone Company as usual look forward for TELEPHONY the same as we do in the states. It may interest you to know that Wusieh, China, will soon have the pleasure of a new Kellogg six-position, 600-line switchboard, replacing one of a foreign make about one year old. When I return to the states will drop in and have a little chat and tell you a few of my many experiences and my appreciation of TELEPHONY. Am enclosing a snap shot of a 'rick-shaw,' coolie and yours truly."

From the flood-soaked district of West Virginia, S. L. Barber, of Cottageville, writes TELEPHONY's circulation department: "Yesterday is the first mail for twenty days. Our exchange floated and we had to take our switchboard out and have not put it back yet. Driftwood covered our line for miles and broke wires in many places. It will take some time to get the lines in order. This is our second flood."

"It is with pleasure that I renew my subscription to TELEPHONY for the year 1913," writes L. A. Walker, treasurer of the Citizens' Home Telephone Co., of Parsons, Kans. "As one of the executive committee of the Kansas Independent Telephone Association, it was certainly good news that our secretary, Mr. F. B. MacKinnon, was selected by the national convention as one of its directors. Anyone connected with the telephone business could not afford to miss the good ideas contained in TELEPHONY."

Mr. Walker's company is one of the strongest in the Sunflower state, and operates exchanges at Pittsburg, Parsons, Oswego, Chetopa, Altamont, Mound Valley, Labette, Edna and Bartlett, with 240 miles of toll line.

"I wish to thank you for the splendid service you have given me in TELEPHONY and the high standard you have maintained," writes O. Thorstenson, of Plentywood, Mont.

"Your fine magazine is duly appreciated," says a letter from the Crescent Telephone Co., of New Salem, Mass.

In ordering TELEPHONY sent to a friend, F. A. Day, local commercial manager of the Mesaba Telephone Co., at Hibbing, Minn., writes: "I wish to add that you get out a very interesting paper each week, and I eagerly await every issue."

G. W. Lineberry, owner of the Green City (Mo.) Telephone Co., in a letter remitting for his 1913 subscription says: "I have taken your journal seven years and couldn't do without it."

"We are having good success with TELEPHONY," writes Chris Stewart of Stewart Bros., of Ottawa, Ill., who with his brother Edward, is making a decided hit with their portable telephone testing set. Mr. Stewart referred to the results of their advertising in TELEPHONY.

The Telephone Inspector and the Troubleman

Continuation of a Series of Articles Begun in the September 7 Issue of Telephony—They Deal in an Elementary and Explicit Manner With Many of the Problems Encountered by Telephone Men in the Operation of Small Exchanges

By A. E. Dobbs

As he was disconnecting the wires, George came back and Will stated the case to him.

"Well," laughed he, "you were working in the right direction, but you did not go far enough with your calculation. The resistance of your circuit is 1.5 ohms. The *internal* resistance of your battery, that is the resistance of the fluid between the carbon and zinc is .5 ohm and that of your receiver 75 ohms. Thus you have a resistance of 1.5 + .5 + 75 = 77 ohms and putting this in your formula you would have $I = \frac{1.5}{77}$ or 1.5 volts ÷ 77 ohms = .0195 of an ampere. That is enough to make a loud click in the receiver.

"Now we will work that formula the other way. We have two cells of battery giving together 3 volts. We connect an ammeter in the transmitter circuit and get .2 of an ampere. What is the resistance of that circuit?"

"You have $E = 3$ volts, $I = .2$, and the formula, therefore, is $\frac{E}{I} = R$. That is, 3 ÷ .2 = 15 ohms," answered Will.

"That is right," approved George, "see if you can get this one. The current delivered to a transmitter circuit is .25 of an ampere. The resistance is known to be 20 ohms. Now what is the voltage, *E*, of the battery?"

"We have *I* and *R* to find *E*, so the formula must be $E = IR$, which is $20 \times .25 = 5$ volts," replied Will.

"When you are figuring up the current in a circuit," George prompted, "you must not forget the *internal* resistance of the batteries, which may be as low as .1 of an ohm or as high as 6 ohms. The same rules apply to generators and motors."

"How do you get at the internal resistance of the battery or generator?" queried Will.

"There are several ways of doing it, but the quickest way is to measure the current through an ammeter and apply the same formula, $R = \frac{E}{I}$. Suppose you have a battery that gives a current of 6 amperes at 1.5 volts. The ammeter generally consists of a very short coil of very coarse wire, so that its resistance is practically nothing, but it should be taken into consideration for obtaining accurate results. If your wire connections are well made the *R* factor should be very low, say .1 of an ohm. In this case, therefore, the internal resistance should be 1.5 volts ÷ 6 amperes = .25 ohm; deducting the .1 ohm for the wire connections would leave .15 ohm as the internal resistance of the battery. By soldering the heavy wire, the connection factor can be eliminated altogether.

"In this connection," George concluded, as he put on his overcoat, "I would say that when you come to read your books, you will find other terms, such as: millivolt, which is .001 of a volt; milliampere, the same thing applied to the current; while microhm is .000001 of an ohm. On the other hand, in measuring insulation we use a large unit, measuring 1,000,000 ohms, which is called a megohm. Besides there are other terms which you can learn later."

They Talk About Generators.

"What is the difference between bridging and series generators?" asked Will, one afternoon a few days later.

"Goodness!" exclaimed George. "Haven't I explanied that to you? Didn't you understand it? It does seem to me that you are rather slow."

"Well, of course, I understand it in a kind of a way," answered Will, "but it is not very clear."

"I guess I was rather hasty," apologized George. "Come to think of it, I had quite a time of it myself getting around that point. It was so long ago that I had forgotten all about

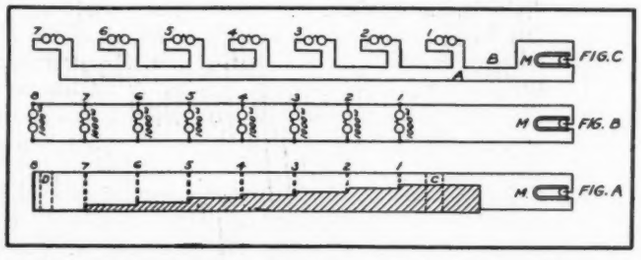


Fig. 60. Illustrations of Series and Bridging Generators.

it for the time being, so that I sometimes take it for granted that everybody should know these things.

"Let me take your pencil. I never can keep a pencil myself unless I cut it up into short pieces and carry the pieces in my trouser pockets. Here is a sketch (Fig. 60-*A*) that describes the case exactly. We have a generator, *M*, giving out current—that is, when there is a path for it to travel over. The armature of the generator being of soft iron, changes its magnetism every time it turns over, while that of the permanent magnets remains constant. This reversal of magnetism creates electrical impulses in the armature coil, which would cross over to the other side of the armature if it could, but the silk or cotton insulation on the wire prevents it, so that it has to seek some other path, and in that way we get it out on the line. Once on the line, it seeks every chance opening to get back again. If the line is properly insulated, it cannot get back except through the path provided for it. Savey?

"If we gave it a chance it would nearly all come back through the path *C*, but we don't propose to give it that chance. Now, supposing that we represent the *quantity* in amperes or milliamperes, as the case may be, by a strip an inch in width. Well, the current goes out on the line on one wire, and finds a path to the other side at station No. 1. It makes a rush to get through, but we have provided for that by inserting in the circuit coils of such high resistance that the current cannot rush this place of leakage, any more than a crowd of people could rush the turnstiles at the park. See?

"We will suppose this resistance is so proportioned that one-eighth of the current passes at this spot, so we will represent that by a strip one-eighth of an inch in width. The other seven-eighths rushes on, dropping off at each station until station No. 8 is reached, when the strip representing the current is only one-eighth of an inch in width and only strong enough to ring Station No. 8. Even here, if there should be a short circuit at the point marked *D*, most of the current, following the path of least resistance, would go up there to cross over, thus hardly leaving enough current to operate the bells behind it, unless the line resistance should be very high. In that case Stations Nos. 1, 2, 3 and 4 might ring faintly, while 5, 6, 7 and 8 would not ring at all. In a machine of this kind, you need a large *quantity* output with *pressure* only high enough to overcome the line resistance and ring the last bell, for if your *pressure* were too high, it might force more than the proper amount

of current through Stations Nos. 1, 2 and 3, and so not give satisfactory results, by leaving too little for the rest. Very few generators of this kind are wound for over 100 volts."

"Now, with a series circuit," George continued, "the case is different, for that style of generator is wound to give a high *pressure* and small *quantity*. We'll suppose the *current* for this multiple circuit (Fig. 60-*B*) be represented by a strip one inch in width, while that of the generator in this series circuit (Fig. 60-*C*) is only one-tenth of an inch. You understand that this would only furnish current enough to ring one ringer, do you not? Well, by connecting the ringers in series and increasing the *pressure* or voltage we can force this amount of current through every one of the ringers. Supposing that it requires 10 volts pressure with this current to ring one of the bells, clearly then, the seven stations would need 7 times 10 or 70 volts to ring the seven stations taking no account of line resistance. As a matter of fact, the generators are generally wound to give a pressure of 70 to 100 volts on no load and, of course, what is left simply increases the current output, and makes a stronger action of the bells possible.

"The series generator is much cheaper to manufacture than the other kind, and is generally used on single subscribers' lines, while its high pressure overcomes the resistance of poorly constructed lines."

"That is very interesting," said Will, "I tried to make that out from some books you lent me, but I couldn't make head or tail of their explanations."

"One thing you must remember," added Mr. Wilson, "is, that these illustrations (Fig. 60) are not scientifically correct, but are merely used as illustrations to help you understand the case. While we speak of current *quantity* as we would speak of gallons of water, bushels of grain or cubic feet of air, it is not correct, but at the present time I express myself that way, for we have no other word that does express it so that you would understand it. When you get farther along, we can take up the subject again."

"What is the difference in the winding of those armatures?" asked Will.

"For a *quantity* current, the resistance of the armature is lower, the bobbin larger, and the magnets much larger and more powerful."

"I think my mind is clearer now about series and bridging generators," remarked Will.

"Talking about generators," broke in George, "reminds me that I received a letter of inquiry this morning which reads: 'I have a generator wound to 275 ohms resistance and giving 150 volts. How many bridged bells should it ring on a line 50 miles long?'"

"Why in thunder don't he try it and find out?" queried Will. "Why, he doesn't even tell you the resistance of his line, or the resistance of his ringers. We can't work any of our formulae on that kind of a proposition. It seems to me that he should have asked the manufacturer that kind of a question before he bought it."

"Well," answered George, "I want to study this a little, and while I am doing that just use your formulae and find out how much current that generator gives on short circuit."

Will scratched his head and looked hard at the letter.

"$E = 150$; $R = 275$; $\frac{E}{R} = 150 \div 275 = .54$ of an ampere," he worked out, finally. "I wonder just what George will do now. I think he'll be stuck this time. Gad, but I'd like to get a question he couldn't answer. I don't believe he can get out of this one, though."

"What have you got?" asked Mr. Wilson, coming back at this moment.

Will showed him his figures.

"The figures seem to be all right—540 milliamperes—but there is one thing you have overlooked, and that is the armature reactance."

Will looked wise, but said never a word.

"We will suppose," continued George, "that the armature is as nearly perfect as it can be, and its reactance is equal to 50 per cent. of its ohmic resistance. This would cut your result and give about 400 milliamperes. Allowing five milliamperes to each set of ringer coils, you would get 80 instruments as the number it would ring in the test room; but then you have line resistance to figure on, and your generator may not always be as perfect as described. Ringer coils will vary greatly. A ringer likely to be used on a line like the one mentioned, will probably respond to a current of one milliampere. Then there will be static capacity and leakage, so that if he gets ten instruments in practice he will be in luck."

"One thing more," interrupted Will, "suppose that your friend wanted an armature which would give twice as much current as the one we were just talking about. How would he get it?"

"Either by taking a greater number of turns of wire, so as to bring his pressure up to 300 volts, or by winding his armature to a lower resistance, so that twice as much current could flow through it at 150 volts; but there are several other factors entering into the calculation, so you better let it drop until you get around to dynamo designing.

"Here is a letter from my old acquaintance, Lon Williams, who is now managing an exchange in a Pennsylvania town. Much of the letter is of a personal nature, but the last paragraph will interest you, so I'll read it:

"'We have here a board which, although an old one, gives good service. The drops are wound to 1,000 ohms and are partly iron-clad. At the time the board was installed, they could not put in ring-off drops, so we left the drops bridged across the line when subscribers were talking. The ring-off drops have since been added, so that now we have ring-off drops with the subscribers' drop coils cut out when the line is in use. Our ring-off drops are bridged across the cords, and they work well enough on most lines, but we have a little trouble with them in ringing off, as well as throwing the drop with our ordinary series generators, many of which have ringer coils wound to 500 ohms.

"'It sometimes happens on short lines that the current goes by the ring-off drop and rings the other subscriber's bell, without throwing the drop. Subscribers have been instructed to ring until they get a clear, sharp ring on their own bells, and to turn the handle three or four times instead of once, as is customary. But sometimes those not familiar with these instructions will ring three or four times before they get central, though their own bell rings, and then blame the girl for not answering them. Can you tell me a remedy for this, or is there none? Our generators are guaranteed for 10,000 ohms, but are tested at 15,000.'

"Well, Mr. William Harrison Butler, what do you think about it?"

"It's plain enough the generators do not give current enough to ring the drop," answered Will.

"Not so fast, my boy" broke in George, "the letter says that the subscriber's own bell often rings, while the drop does not fall."

"Oh, hang it all, answer the question yourself, if you can, I'm out of it," ejaculated Will. "What makes people ask such fool questions, anyway? Why doesn't he fall back on the manufacturer and make him fix the board?"

Will was thoroughly vexed, nor was his temper improved by George laughing and advising him to take a liquid air bath to reduce his temperature. George was sometimes very aggravating. Will's temper, however, was only a flash in the pan, and he was soon asking George if he could answer the question.

"Nothing easier," was the reply. "Coils of widely different

resistances do not work well together. Do you remember the trouble you had with that 1,000-ohm ringer?"

"Yes, but that would not throw the drop, though it would ring itself but in this case a subscriber can ring his own 500-ohm bell. I should think the 500-ohm ringer beyond would virtually take all the current and the high resistance drop would not get enough to operate it."

"That's pretty good reasoning," commented George. "Do you remember my telling you that it took the current some little time to saturate the core of a 1,000-ohm drop? Now, a current comes along and starts to 'soak' into that coil, but before it has time to get down to business, it is reversed and starts to surge out again just in time to meet the incoming current. Of course, there is a collision, and neither wave can do any business at first, although the incoming wave conquers. No sooner does it do so, than it loses its own e. m. f. and is in turn thrown back on the line; but the static effect makes bell may ring a little. Then, too, the coils produce waves of a partially closed circuit by induction so that the subscriber's different volume, which do not harmonize."

(To be continued.)

The Bloomington-Kinlock Company Entertains Employes.

The Bloomington-Kinlock Telephone Co., of Bloomington, Ill., recently entertained its employes at a card party and dance. When the guests had assembled, President Lillaird welcomed the guests in a few well chosen remarks, placing particular emphasis on the importance of co-operation between employe and employer. Manager Ainsworth, of the Bloomington exchange, and Miss Barnes, chief operator, planned and successfully carried out an evening of excellent entertainment. The out of town guests included the Misses Hazeltine and Loehr, of Carlinville, and Messrs. Parks, of Heyworth, and Teece, of Peoria.

Practical Telephony for the Practical Exchange Manager

A Series of Articles Relating to the Construction, Maintenance and Operation of a Moderate Size Telephone Exchange, Which Began in the Issue of September 21, Expressed in Everyday Terms, Easily Understood—Principles Easily Applied

By H. R. Van Deventer

Transmitters often increase in resistance without any apparent cause, until it is impossible to operate the line signal through them. The exact cause of this is not well understood. It seems to be a condition the reverse of "packing;" or a condition of high resistance of the electrodes. Cases of trouble of this nature are remedied only by changing the transmitters.

Disintegration of the insulation through age, heat, corrosion, etc., is common. It can be guarded against somewhat, but the only safe way is to use modern apparatus in which this insulation difficulty is reduced to a minimum.

As long as the diaphragm packing is intact, the insulation in and about the bridge or cell does not suffer. Many of the older types of transmitters employed a rubber band about the diaphragm. This band is attacked by the saliva and often a chemical action is set up which totally destroys the rubber. A new band may be put in, provided the transmitter is properly handled as previously described. The hard rubber washers, strips and bushings sometimes employed are easily renewed if attacked. Often a corrosive deposit occurs at the edge of such pieces of hard rubber and forms a partial short circuit from one part to another.

In conclusion, do not fail to examine carefully the connecting cord where it joins the cord tip. Corrosion takes place where the cord is soldered to the tip and many times noise may be traced to this point.

Transmitters must be carefully handled. They should not be carried in a tool bag for a week or two and then be expected to give satisfaction. If the transmitter is dropped, the mica diaphragm of the button will probably be broken. This often occurs with desk stands and operators' chest sets.

Operators' transmitters are subjected to all kinds of abuse. The cords are knotted and twisted and the transmitters are dropped or thrown about. Often the transmitter is laid down with the diaphragm up and current passes through it for an hour or so, thereby burning the front electrode and carbon and making the instrument permanently noisy.

In some switchboards, there is not sufficient resistance between the battery and the operator's transmitter. The circuit employed by the Bell companies is shown in Fig. 38-*A*, a 165-ohm retardation coil being employed. Most Independent companies employ a 200-ohm impedance coil, as their instruments are of slightly different resistances. The arrangement of the induction coil is different, being as shown in Fig. 38-*B*, so that its resistance is not in circuit

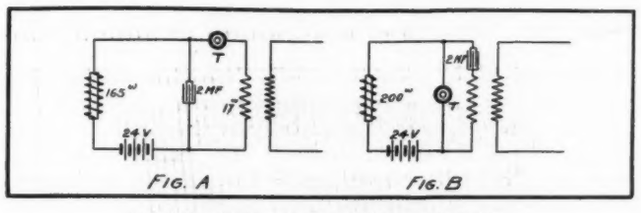


Fig. 38. Operators' Telephone Circuits.

with the transmitter. If the resistance of the impedance coils in either of these circuits is lowered, the transmitters will get excess current and may fry.

In some exchanges considerable difficulty is experienced with the operators' transmitters. A very good way in endeavoring to remedy noisy conditions is to increase the resistance of the impedance coils. This in a measure will cut down the efficiency, but unless the resistance is excessive, the loss will not be harmful.

So far no reference has been made to refilling the carbon chamber in transmitters because such a proceeding is not practical, except in the hands of factory experts. In some isolated exchanges attempts are made to refill the carbon chamber or "button," but the success is doubtful. When this is done, care must be taken that granular carbon is ordered from the same factory that made the transmitters and to specify whether it is to be used for common or local battery transmitters.

In plants that are changing from local to common battery, the transmitters should be changed. The old local battery transmitters will not give satisfaction as they will fry and are inefficient. The carbon cannot be changed and produce perfect results, as the separation of the carbon buttons is different in the common and local battery instruments. The distance cannot be changed as it would necessitate an entire re-arrangement of the button or cell structure. *(To be continued.)*

From Factory and Salesroom

Stromberg Generator Call Multiple Switchboard System.

The tendency for several years has been to standardize on the self-restoring drop equipment for the usual local battery system. There has been an increasing demand for generator call switchboards and, while most of these have been plants beginning with from 50 to 300 lines installed, it is, nevertheless, true that the popular and efficient generator call visual signal switchboard is adopted in a great many cases where local conditions are in favor of having

The Visual Signal Stromberg-Carlson Board at Moultrie, Ga.

a system so large that a generator call multiple switchboard with visual signal line equipments is preferred.

The visual signal combines both the efficiency and the mechanical strength of the original tubular drop, but, at the same time, possesses the rapidity of the central energy lamp, or visual signal, switchboard. The visual signal has proven itself capable of handling the business of both lightly and heavily loaded lines, the latter having no more effect on the operation of the visual signal than if it was a regular tubular drop.

The Stromberg-Carlson visual signal is being supplied for magneto exchanges where the capacity of the plant begins with more than 250 or 300 lines and where, on account of local conditions, it is not advisable to install a small common battery lamp line signal system.

There are a number of enthusiastic operators about the country who have found particular advantages in operating the visual signal multiple switchboard. One of the most recent advocates of this system is H. E. Parrish, general manager of the Moultrie Telephone Co., Moultrie, Ga.

The illustration shows the main exchange, which was recently installed for this company. It consists of two No. A-1522 cabinets equipped with 160 line circuits in the first and second positions of the first section, and 160 line equipments in the first position of the second section. At the end of the multiple sections is the terminal frame equipment. It is evident from the illustration that this is a busy office.

Mr. Parrish claims that this is one of the most prominent Independent telephone exchanges in the south country. At the extreme left is Bob Willis, superintendent of construction, and at the extreme right is J. A. Helvin, salesman for the Stromberg-Carlson company. Mr. Parrish is seated at the table in the foreground. Three linemen are shown in the picture, including one colored man holding a wall telephone, of which he is justly proud. Notice the "Big Ben" clock, which would indicate that the operators who handle the business in the city of Moultrie are on duty always at the right time.

Further particulars about the features of a generator call visual signal multiple switchboard will be furnished by the Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

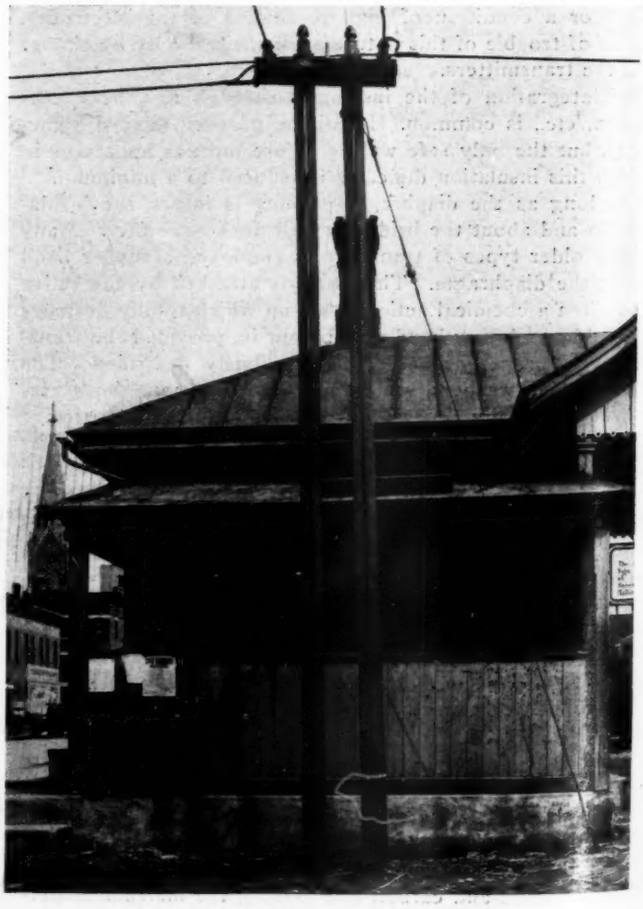
Traffic Figures Were Low.

In the article regarding the service furnished by the Warren & Niles Telephone Co., at Warren, Ohio, published in last week's issue of TELEPHONY, a typographical error was made in the figures concerning the traffic. It was stated that on the day when the water was at its highest point, the Automanual exchange carried a load of 24,000 calls and that the traffic during the flood week required the services of four and five operators while on one day six operators were on duty most of the time.

The figure published for the load was, through a typographical error, given as 24,000 calls when in reality it was 34,000 calls. This load explains the presence of the sixth operator on the day the flood was highest. The successful handling of this traffic under flood conditions, with only the six operators, is a feature in which the telephone company and the manufacturers of the Automanual equipment take great pride.

A Difficult Location for Anchoring.

The accompanying illustration is reproduced from a photograph taken on Market Square, La Crosse, Wis.



D. & T. Anchor Used in Close Quarters.

The entire square is paved with concrete and the twin poles are about four feet from the scale house. It was

necessary to anchor the poles to the left and to the rear. The anchor had to be set close to the building which had a concrete base.

To install a dead man under these conditions would have meant the tearing up of at least four square feet of macadamized pavement. By using the Drive & Twist anchor, it is necessary to chisel a hole in it about six inches square and the anchor was driven diagonally under the concrete foundation of the building. The small hole in the pavement was quickly filled in and the total cost of the anchorage was about $2. The estimated cost of a dead man is $6.

Raven Efficiency Devices.

The dominant aim of all telephone companies today is efficiency—to give efficient service. Efficiency within the operating company necessarily means satisfactory service to its subscribers. That is to say that, with the proper equipment and efficient details of operation, a company is able to give the right service. The Supply Sales Department of the Automatic Electric Co., in its very first step of organization, recognized this fact and has turned its united effort toward perfecting and producing efficient telephone devices. That it has succeeded is attested by the enthusiasm and hearty approval with which Raven Brand supplies have been greeted.

One of the most efficient devices put out by the Automatic Supply Sales Department is the Automatic Monitor System, by the use of which a telephone manager may supervise the line unbeknown to the operator. By merely pushing a button, the manager may come into touch with the "service" branch of the system and learn the treatment accorded subscribers by his operators. The knowledge of such a monitor system tends to promote efficiency in the operating force.

Another efficiency promoting detail or part is the Pioneer direct current receiver. This receiver dispenses with the use of permanent magnets, in their place utilizing the transmitter direct current for establishing a magnetic field.

It is said to be a sturdy instrument, simple in design, being composed of few parts, readily interchangeable. No induction coil is used with the Pioneer direct current receiver, consequently there is no loss in the voice currents in transforming by induction.

Raven Brand cords, it is said, are performing to the entire satisfaction of the most exacting companies, playing well their important part in the scheme of efficient service. The Automatic Supply Sales Department has placed these and many other supplies on the market and their progress and growth with the Independent telephone field will be watched with interest.

How Ironite Stood Flood Test.

The Paragon Sellers Co. reports a very gratifying increase in the volume of its business and, while there has been a steady increase for some time, the increase since the first of the year on its entire line has been remarkable. The recent tornado and floods have been severe tests on drop wires and it is claimed that the worth of Ironite has been proved conclusively by its performance under these tests. Where other drop wires have failed to stand the strain, Ironite, it is said, has been the means of preserving and re-establishing communication in thousands of localities in the stricken region.

The company has shipped into the flood districts hundreds of thousands of feet of wire in the last two weeks and there seems to be no let up in the demand. Just as no chain is stronger than its weakest link, so is the value of drop wire determined by its ability to withstand extraordinary service tests. Thousands of feet are being used where the wire is not strung on poles but allowed to lie in the water, mud and debris and still it gives uninterrupted service.

The demand for Ironite has increased to such an extent that the company has had to provide an increase in production of 25 per cent. and this will be followed by another increase of the same amount within a few weeks.

The full line including Paragon Ground Cones, Paragon Self Tying Knobs, Paragon Battery Boxes, etc., is being widely used by many operating companies who believe the material that gives continuity of high grade service is the cheapest and best. Samples and prices will be sent on requests to the Paragon Sellers Co., Madison Terminal Bldg., Chicago.

Latest Addition to Coffey Audit Staff.

As recently stated in these pages, H. E. Waterhouse, of London, England, has joined the staff of the Coffey System & Audit Co., of Indianapolis. Mr. Waterhouse is a thoroughly finished accountant, having had many years of experience in this line. He was connected with the auditing staff of the National Telephone Co., in England, for 12 years and is entirely familiar with telephone accounting methods in general. He is now specializing in the Coffey system and has been busy installing it for the Coffey System & Audit Co.'s customers since his connection with that concern was established.

H. E. Waterhouse.

A Substantial Endorsement.

W. N. Matthews & Bro., St. Louis, Mo., have just received this letter from the Brevard County Telephone Co., of Indianola, Fla., signed by the general manager, A. A. Buck:

"Replying to yours of the 22nd ulto. will state we are using an ordinary 15-pair lead-encased aerial cable for crossing the Indian River at Cocoa, Fla., to Merritt's Island, a distance of 7,750 feet. This cable was laid on the river bottom, which is of sand, and we have had no trouble of any kind except from sharks and sawfish, which evidently take the cable for eels, biting and striking it, causing various sizes of punctures, generally small. We have had some twenty odd punctures from this cause, in nearly all cases the teeth just going through the lead case.

It was rather a difficult matter to locate these punctures with the ordinary cable testers, on account of the varying amounts of moisture and the difficulty of knowing just how many feet from the shore you are, even if you have an accurate measurement of how far from the end of the cable the puncture is, and often the puncture is so small it is hard to see or find with the eye.

We purchased a Matthews Telefault and must say it has given the very best of satisfaction. No matter how large

or small a puncture, it will readily locate the moisture, show amount of cable that is wet, giving us an idea whether it is necessary to splice in a section or if it can be dried without cutting. If we dry it, it will also show when it is dried.

We find it unsatisfactory to try to dry out more than six inches of water, so you can readily see what a great advantage it is to know how much of the cable is wet.

On account of the rapidity of locating wet spots with this tester, we seldom have to splice in a section, as in some cases we locate the moisture, dry it out and return to river bed within three hours after puncture.

If the above will be of any interest to you, you are at liberty to use it to the best of advantage, as I appreciate the fact that the more these testers are used the better for the telephone business."

The Big Smoke.

"Where there is so much smoke there must be some fire." There certainly is plenty of smoke in Pittsburgh, Pa., that home of millionaires and pickles, but the livest coal ye scribe was able to find was The Union Electric Co. They are certainly live ones and, while they do carry 57 varieties of telephone supplies, they carry only one line of telephones.

Of course that one line is the famous Ericsson. This is mighty comforting news to the good old Pennsylvania Dutchman, because if there is anything he likes it is comfort. And what is more comfortable than an Ericsson Handmike when he sits back in the easy chair with a pipe in one hand and a Handmike in the other? His only complaint is that he can't carry it down cellar when he goes to fill the pitcher.

Everyone in Pennsylvania is not Dutch, of course, but they all like comfort and so they all like Handmikes.

A New Auditing and Appraisal Company.

The new public utilities law in Indiana has called into existence the Indiana Audit and Appraisment Co., the purposes of which are to value and appraise all utilities; audit accounts, including banks, trust companies and all public offices; and to act as appraisers of real and personal property, trustee, assignee and receiver on order of the courts. The officers of the comany include some well known men in the business world. John W. Coffey, of Indianapolis, is president, and L. A. Herrick, of Freeport, Illinois, is treasurer. These gentlemen are well and favorably known in telephone circles. The secretary, W. C. B. Harrison, is a well known accountant who has occupied prominent official and business positions in Indiana.

The new company has opened offices in the Pythian Building, Indianapolis, but expects to operate in a number of states.

Steinberger Declared Inventor of Suspension Insulator.

The Court of Appeals of the District of Columbia, recently handed down a decision on the appeal in the case of Edward M. Hewlett, appellant, versus Louis Steinberger, president of the Electrose Mfg. Co., Brooklyn, N. Y., appellee. This court affirmed the decision of the Commissioner of Patents and awarded to Mr. Steinbarger priority of invention of a disk strain insulator. The insulator is comprised of suspension members partially enveloped by a mass of insulating material and having a disk portion provided with annular collars or flanges extending in opposite directions therefrom and generally parallel with the suspension members.

Distinctive Advertising Literature.

The American Telephone Fire Alarm Co., Otis Building, Chicago, has issued some pamphlets descriptive of the Denio fire alarm equipment,, which are probably the handsomest things in the line of advertising literature that have ever come to TELEPHONY's office. The illustrations, in black and red, are fine specimens of the engraver's art. Each page carries a fine line red border.

"The first five minutes is worth the next hour" is the slogan on each fly leaf. A general discussion of the subject of fire protection and present immense annual fire losses is followed, in part one, by a summary of the reason for the absolute dependability of the Denio system, and letters of endorsement from various authoritative sources. Part two is given up to a full description of the system and the manner in which it is applied by telephone companies.

The company's affairs are progressing rapidly and satisfactorily and it will shortly be prepared to make announcements of more than common interest to the telephone field.

Paragraphs.

THE REBUILT TELEPHONE EQUIPMENT CO., of Chicago, has been obliged to move into larger quarters because of increased business. It now occupies 4,000 ft. of floor space in its new location at 2127-2129 W. 21st St. The Rebuilt company has purchased the old equipment of the Ft. Dodge Telephone Co., of Ft. Dodge, Iowa, which recently rebuilt its plant in that city.

THE SCRANTON BUTTON CO., of Scranton, Pa., manufacturer of composition specialties for telephone and electric appliances, has recently appointed the Geo. T. Westcott Co., 136 Lake St., Chicago, as its Western representative. The personnel of the latter company consists of Gordon D. Wilson and G. R. Schoof who are both well known to the telephone trade.

THE STANDARD UNDERGROUND CABLE CO., Pittsburgh, Pa., has issued a new standard price list on "Sterling" new code rubber covered wire. The price list is in convenient and durable booklet form in two colors and gives prices on "Sterling" wire for bases ranging from 13 to 20 cents for solid and stranded wires of all commercial sizes. Appended are explanatory notes and a list of electric wires, cables and cable accessories manufactured by the company. The price list will be sent on request.

THE HEMINGRAY GLASS CO., Covington, Ky., has recently published a booklet, which contains valuable and interesting information regarding glass insulators that has not previously been widely circulated. Proper annealing is dealt with and this is given as the prime reason for the uniform success of the Hemingray insulator.

Tests made by Professor Albert S. Richey and Francis J. Adams of the Worcester, Mass., Polytechnic Institute, using different types of insulators, are described and the average flashover voltage of each type is given in tables. These tests indicate that the Hemingray insulators all have a much greater factor of safety above the voltages which they will be called upon to carry, than engineer might specify. This booklet can be had upon request.

Uraguay to Reorganize National Telephone System.

The government of Uraguay is about to undertake the reorganization of the national telephone and telegraph system, for which purpose the executive has been authorized to contract a loan of $392,920.

Among the contemplated extensions and improvements are the construction of a line between Salto and San Eugenio, on the border of Brazil, the reconstruction of all lines, with weatherproof wire, and the placing underground of the wires in the department of Montevideo. Iron and steel poles are to be used, and the wires will be used for the simultaneous transmission of telephone and telegragh messages.

The Board of Posts and Telegraphs (La Direccion General de Correos y Telegrafos) has been authorized to receive tenders for the materials needed for the improvements planned.

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The Court of Appeals of the District of Columbia, recently handed down a decision on the appeal in the case of Edward M. Hewlett, appellant, versus Louis Steinberger, president of the Electrose Mfg. Co., Brooklyn, N. Y., appellee. This court affirmed the decision of the Commissioner of Patents and awarded to Mr. Steinbarger priority of invention of a disk strain insulator. The insulator is comprised of suspension members partially enveloped by a mass of insulating material and having a disk portion provided with annular collars or flanges extending in opposite directions therefrom and generally parallel with the suspension members.

Distinctive Advertising Literature.

The American Telephone Fire Alarm Co., Otis Building, Chicago, has issued some pamphlets descriptive of the Denio fire alarm equipment, which are probably the handsomest things in the line of advertising literature that have ever come to TELEPHONY's office. The illustrations, in black and red, are fine specimens of the engraver's art. Each page carries a fine line red border.

"The first five minutes is worth the next hour" is the slogan on each fly leaf. A general discussion of the subject of fire protection and present immense annual fire losses is followed, in part one, by a summary of the reason for the absolute dependability of the Denio system, and letters of endorsement from various authoritative sources. Part two is given up to a full description of the system and the manner in which it is applied by telephone companies.

The company's affairs are progressing rapidly and satisfactorily and it will shortly be prepared to make announcements of more than common interest to the telephone field.

Paragraphs.

THE REBUILT TELEPHONE EQUIPMENT CO., of Chicago, has been obliged to move into larger quarters because of increased business. It now occupies 4,000 ft. of floor space in its new location at 2127-2129 W. 21st St. The Rebuilt company has purchased the old equipment of the Ft. Dodge Telephone Co., of Ft. Dodge, Iowa, which recently rebuilt its plant in that city.

THE SCRANTON BUTTON CO., of Scranton, Pa., manufacturer of composition specialties for telephone and electric appliances, has recently appointed the Geo. T. Westcott Co., 136 Lake St., Chicago, as its Western representative. The personnel of the latter company consists of Gordon D. Wilson and G. R. Schoof who are both well known to the telephone trade.

THE STANDARD UNDERGROUND CABLE CO., Pittsburgh, Pa., has issued a new standard price list on "Sterling" new code rubber covered wire. The price list is in convenient and durable booklet form in two colors and gives prices on "Sterling" wire for bases ranging from 13 to 20 cents for solid and stranded wires of all commercial sizes. Appended are explanatory notes and a list of electric wires, cables and cable accessories manufactured by the company. The price list will be sent on request.

THE HEMINGRAY GLASS CO., Covington, Ky., has recently published a booklet, which contains valuable and interesting information regarding glass insulators that has not previously been widely circulated. Proper annealing is dealt with and this is given as the prime reason for the uniform success of the Hemingray insulator.

Tests made by Professor Albert S. Richey and Francis J. Adams of the Worcester, Mass., Polytechnic Institute, using different types of insulators, are described and the average flashover voltage of each type is given in tables. These tests indicate that the Hemingray insulators all have a much greater factor of safety above the voltages which they will be called upon to carry, than engineer might specify. This booklet can be had upon request.

Uraguay to Reorganize National Telephone System.

The government of Uraguay is about to undertake the reorganization of the national telephone and telegraph system, for which purpose the executive has been authorized to contract a loan of $392,920.

Among the contemplated extensions and improvements are the construction of a line between Salto and San Eugenio, on the border of Brazil, the reconstruction of all lines, with weatherproof wire, and the placing underground of the wires in the department of Montevideo. Iron and steel poles are to be used, and the wires will be used for the simultaneous transmission of telephone and telegragh messages.

The Board of Posts and Telegraphs (La Direccion General de Correos y Telegrafos) has been authorized to receive tenders for the materials needed for the improvements planned.

AUTOMATIC
RINGING
TRANSFORMER
Automatic Transformer Co., Kansas City, Mo.
Dear Sirs:
Please forward us one complete set of springs with platinum contacts for our transformer, so that in case of trouble or in an emergency we will have these at hand. It has been in operation ever since it was shipped us, without a single stop, and I don't know how much longer this will continue, but thought perhaps, sooner or later we might need contact springs and wish to be prepared for such an emergency. We are exceedingly pleased with the results obtained from your Generator, as it has taken the place of a power that cost us $3.50 per month, as well as quite a little trouble to keep in repair, while yours only costs us about 50c per month with no trouble whatever.
Yours respectfully,
HANAMO TELEPHONE CO.,
By H. C. Todd, Mgr.
MARYVILLE, MO.
Like Results Can Be Had in Your Exchange
If you have our catalog order a Ringing Set now. If you have no catalog write for a copy at once.
THE AUTOMATIC TRANSFORMER CO.
Ringing Equipment Specialists
407 Broadway
KANSAS CITY, MO.

"Cost of Ringing Current Reduced from $42 to $6 per Year"

Severe tests have been made with the Gottschalk Transmitter by "big" engineers

Naturally this would be the case. The **Gottschalk** transmitter represents a step forward in the art—it might be termed a radical improvement. Mr. Gottschalk has concentrated all his time to the perfection and correct design of the diaphragm and cell of his transmitter.

The **Gottschalk** transmitter is specially adaptable for use in mines, by railroads in public places, etc.—is water-proof, sanitary—dispenses with mouthpieces, thus eliminating a big maintenance expense item.

Gottschalk Waterproof Sanitary Transmitter Co.
160 Broadway, New York

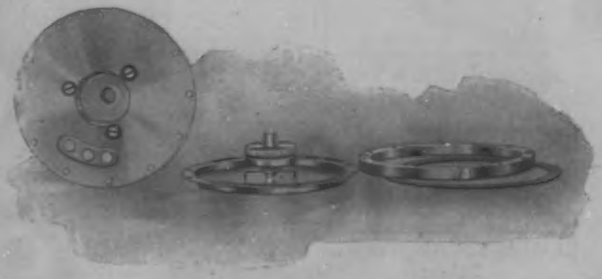


Illustration showing diaphragm of Gottschalk Transmitter, Cell, etc.

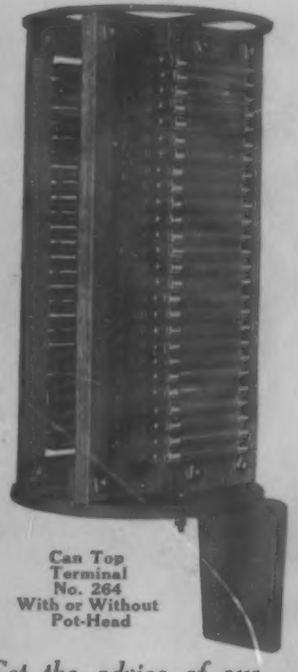
ARE you improving your service? Making any additions or changes to your present equipment and construction?

Are you giving your telephone system a spring cleaning? Then this is the time to install

LAFAYETTE

Protective Apparatus

You had plenty of time to realize the need of dependable Can Top terminals, arresters, etc., during the winter and season of violent storms. And *now* is the time to put into effect the resolutions made when the need of such apparatus was vivid.



Can Top Terminal No. 264 With or Without Pot-Head

LAFAYETTE equipment gives *satisfactory service* under *all* conditions. Made of the *highest grade of raw material*—by practical telephone engineers keen to the needs of such apparatus.

We are in a position to help you solve your particular problem. *Get the advice of our engineers, gratis.* Instructive literature sent upon request.

This is the time to install LAFAYETTE Protective Apparatus

La Fayette Electric & Mfg. Co.
LaFayette, Ind.

American Steel & Wire Company

Americore Rubber Covered Wire

Railway Exchange Building, St. Louis

OVER 700,000 feet of our best grade rubber covered wire used in this building.

Every foot is carefully inspected by us in the various stages of manufacture, and when completed is finally examined and labeled under the direction of the Underwriters' Laboratories.

We are prepared to furnish this wire in all sizes and conductors, both solid and flexible, from warehouses conveniently located for quick delivery to all parts of the country.

Chicago New York Worcester Denver
Cleveland Pittsburgh

NATIONAL

Copper Tube Wire Connectors

produce practically a welded joint. They make a splice ***stronger than the line itself.***

They are made ***exact*** in size and ***right*** in quality

National copper tube connectors enable ***quicker, better line repairing***—and that is what you want now—isn't it?

Write for literature and prices.

NATIONAL TELEPHONE SUPPLY COMPANY
3922 Superior Avenue, Cleveland, Ohio

3 GRATIS

Blackburn's *Boltless* Guy Clamp

Blackburn's *Boltless* Pole Clamp

Blackburn's *Boltless* Twin Guy Clamp

Blackburn's Messenger or Wire Splicer

If We Deliver 3 BLACKBURN Boltless Guy Clamps

on the job—ready for immediate attachment and you use them—we'll be satisfied and so will you. You'll appreciate their *economy of time and labor*—and they save three to four feet of guy strand. They are the only clamps which save material as well as time and labor. One company found a ***saving of 45c per pole*** in the use of Blackburn Guy Clamps.

Tell us where to send you 3—gratis.

Everstick Anchor Co.
ST. LOUIS, MO.

Legal Cases and Decisions

By A. H. McMillan

Forfeitures.

One, Holt, transferred stock of the Central Maine Telephone Co. to the New England Telephone & Telegraph Co., under a contract by which the latter company was to transfer its own equipment at Skowhegan, Maine, to the Central Maine company, within two or three years or forfeit $500. In two years, the plan of the New England company for consolidation was ratified at a meeting at which Holt presided, under which the transfer was made to the Maine Telephone & Telegraph Co., securing to all parties interested practically the same results as a transfer to the Central Maine would have done. Holt thereafter participated in the reorganization, in pursuance of the action at such meeting. Holt sued the New England company to recover $500 as a forfeiture for alleged breach of contract. The court held that he was estopped by his conduct from claiming a forfeiture.

In making this decision the court made the following definitions of waiver and estoppel:

"Waiver is a voluntary relinquishment of a known right, benefit or advantage which would otherwise have been enjoyed.

"Estoppel is a rule of law which prevents a party from asserting his rights when he has so conducted himself that it would be contrary to equity and good conscience for him to allege and prove the truth. His conduct need not be characterized by an actual intent to mislead or deceive. His acts, declarations or silence must be of such a character as to have the natural effect of influencing the person to whom it is addressed to do, or not to do, to his detriment, what he would not otherwise have done."

Holt vs. New England Telephone & Telegraph Co., 85 Atlantic, 159.

An Unconstitutional Tax.

An ordinance of the city of Cordele, Georgia, laid a tax of $100 for revenue purposes on every telegraph company operating or doing business in the city, or in lieu thereof, required every such company to pay $2 per pole in the city limits. A telegraph company, having failed to pay the tax, was adjudged guilty and sentenced to pay the penalty prescribed in another ordinance of the city. The defense was made that the ordinance was unreasonable and also void as an unlawful interference with interstate commerce. The court sustained these defenses, holding the ordinance unconstitutional.

The court stated that the principle governing the case was that telegraph companies which accepted the provisions of the post roads act should not be taxed by the authorities of a state for any messages, or receipts arising from messages, from points within the state to points without the state, or from points without the state to points within the state, but that such taxes might be levied on all messages carried and delivered exclusively within the state. The foundation of this principle was said to be that messages of the former class were elements of commerce between the states and not subject to legislative control of the states, while the latter class are elements of internal commerce solely within the limits and jurisdiction of the state, and therefore subject to its taxing power. Postal Telegraph-Cable Co. vs. Cordele, 76 Southeastern, 744.

Telephone Rates.

Power on the part of an incorporated city or town to fix municipal telephone rates can only be derived from the legislature by express grant or by necessary implication from powers expressly granted. So held the Supreme Court of Oklahoma in a suit involving an ordinance passed by the city council of Oklahoma City, governing the Pioneer Telephone & Telegraph Co.

The ordinance provided what the maximum rate for telephone service should be, it allowing the company to make an increase of rates for every one thousand increase in telephones. While the telephone company was doing business under this ordinance, the Corporation Commission made an order that no telephone company in the state should charge a greater or different rate for service than was in effect October 12, 1908.

The Burrows Oil Co. made a complaint against the Pioneer Telephone & Telegraph Co., to the effect that it had raised its rates from $3.75 to $4.10 per month, contrary to the order of the Corporation Commission. The company admitted the charge, but stood on its rights so to do in accordance with the ordinance, which the commission held was no defense.

The commission contended that the city had no right to insert in the ordinance, a provision fixing rates. This was denied by the telephone company which contended that the city had the right to fix rates under power "to authorize the construction and maintenance of * * * * telephone wires * * * * * and to grant franchises and rights * * * * for such purpose and to regulate the same." This language the court held did not grant the city the right to regulate rates. Pioneer Telephone & Telegraph Co. vs. State, 127 Pacific, 1073.

Telephone Protection Against Lightning.

Action was brought against a telephone company for the burning of a store by lightning, alleged to have been caused by the negligence of the company in not providing the usual safeguards for caring for the extra voltage. The company contended that the loss was occasioned by an act of God, for which the company was not responsible.

The court was asked to take judicial notice of the fact that no known device can guard against the effects of a bolt of lightning and therefore to say that the failure of the company to provide insulators, ground rods, or other usual devices was not a cause of the burning. The court refused to take judicial notice of the fact that the effects of lightning on the telephone wire might not be minimized and rendered harmless by the precautions usually taken by telephone companies. The court further said:

"It is a matter of common knowledge that lightning frequently plays along or near telephone lines, and that our houses are secured although telephones are placed in them; rather than a menace, a well-installed telephone has come to be regarded a protection against the lightning's stroke. It may be true that there is no protection against the destructive effects of a direct bolt of lightning of high voltage, but we must be wiser than we are, even after reading carefully the testimony of the experts of the plaintiff in error, to hold that the indirect effects of the indirect forces of a stroke of lightning may not be minimized and rendered harmless by those safeguards in such common use, and, in so far as the evidence before us discloses such as have never failed to accomplish the uses for which they were designed."

Peninsula Telephone Co. vs. McGaskill, 60 Southern (Fla.) 338.

Placing a Distributing Pole.

The poles and wires of an electric light company were placed in an alley some years previous to the erection of a telephone distributing pole about two and one-half feet away on adjacent private property. The telephone wires were contained in underground conduits in the form of a cable and the cable was carried up the side of the telephone pole in a metal tube to the bottom of the cable box, which was nearly 30 feet from the ground.

There was a platform on the poles 27 feet from the ground. The top of the pole was over 38 feet from the ground. The electric light poles were about 15 feet shorter than the telephone poles. The top cross arm of the light pole carried two insulated and two uninsulated wires. The other cross arms carried insulated wires. The bare wires were used as guard wires, and were not intended to carry electricity. The top of the cable box from which the telephone wires emerged for distribution, was nearly 10 feet above the top of the light poles, and there was no opportunity for any of the wires of the telephone company to come in contact with the wires of the light company. These facts were held not to establish negligence on the part of the telephone company in placing its distributing pole in the position where it stood.

The question arose in an action brought for the death of an employe, who was killed in ascending a telephone pole in proximity to an insulated wire belonging to an electric light company. The question of his contributory negligence was held to be for the jury. Wilkins vs. Water & Light Co., 138 Northwestern, 755.

Condensed News Reports

Officers of Companies are Earnestly Requested to Forward Us Promptly All Financial and Other Statements as Soon as Issued, and Any Items of Interest as to Their Plants and Systems

Personals.

P. KERR HIGGINS, of San Antonio, has been made general superintendent of the Brazos Valley Telephone & Telegraph Co., and its associated companies with headquarters at Waco, Texas.

LLOYD B. WILSON, of Grand Island, has been promoted to the position of division commercial manager for the Bell telephone company, with headquarters at Omaha. His territory includes Nebraska and South Dakota.

H. J. ACKLES has resigned his position as local manager for the New York Telephone Co., at Rome, N. Y. Merton Barnes, who was transferred to the Oswego exchange about a year ago will return to Rome to fill the vacancy caused by Mr. Ackles' resignation.

B. C. KEEPRING, manager for the American Union Telephone Co., at Mahonoy City, Pa., has been transferred to Norristown. John Powell, who for the past few months has been located at Shamokin, will assume the duties of Mahonoy City and Shamokin together, with headquarters at Mahonoy City.

J. H. W. REES, former executive advertising manager of the National Progressive Party, and, until quite recently, advertising and sales manager of Lint-Butscher-Ross, Inc., New York, has accepted a position with the Metropolitan Telephone & Telegraph Co., of New York, as manager of its advertising and publicity department.

Obituary.

ROGER V. SCUDDER, president of the Wesco Supply Co., St. Louis, Mo., recently committed suicide at his home in that city. It is said that overwork caused his health to suffer. Mr. Scudder was 45 years old.

THEODORE THORWARD, the founder of the Home Telephone Co., of South Bend, Indiana, and the promoter of other Independent telephone companies throughout the state, died

Theodore Thorward.

recently, after an illness of several years. He was 54 years of age and succumbed to an attack of Bright's disease, which compelled his retirement as president of the Home Telephone Co., several years ago.

New Companies.

MIDDLETOWN, IOWA.—A new telephone company is being formed here by D. B. Jones and others.

NOLANSBURG, KY.—The Citizens' Telephone Co. is being organized by W. T. Smith and others. The capital stock is to be $500.

RIGGSVILLE, MICH.—The Riggsville Roadway Telephone Co. has been organized. The officers are as follows: President, Lewis Hubacher; vice-president, John A. Western; secretary, Victor Carlson; treasurer, Joseph Bur; business manager, Albert J. Carlson.

STRANDQUIST, MINN.—The Northwestern Minnesota Telephone Co. has been organized with $10,000 capital stock. The offices and incorporators are: President, L. M. England; vice-president, Lewis Anderson; secretary, L. C. Franzen; treasurer, N. A. Johnson.

CLAYTON, N. C.—The Archer Telephone Co. has been incorporated to operate a telephone system between this place and Archer. The officers are as follows: President, R. R. Gulley; vice-president, J. W. Barnes; secretary and treasurer, W. L. Stancil.

HURDSFIELD, N. D.—The Crystal Lake Telephone Co. has been organized with a capital stock of $10,000. The incorporators are: Fred Deitrich, T. J. Lacock and C. Knutson.

NOME, N. D.—Articles of incorporation have been filed by the Nome Telephone Co., with $25,000 capital stock. The incorporators are: M. H. Wilberg, C. P. Miller and G. O. Peterson, all of Nome.

CLEVELAND, OHIO.—The Brickner Telephone Co. has been incorporated with a capital stock of $300 by David A. Eickholt, C. Mathies, Joseph Seize, Frank M. Brickner and John A. Nomina.

DUNDEE, ORE.—Articles of incorporation have been filed by the Orchards Home Telephone Co. with $1,500 capital stock. The incorporators are: Roe Robinson, W. S. Allen, H. B. Powell and E. S. Greer.

MENO, OKLA.—The Farmers' Rural Telephone Co. has been organized with $2,000 capital stock. The incorporators are: P. P. Ratzlaff, C. E. Carlson, D. B. Unruh, P. W. Jontz, J. H. Bergdall, W. G. Morah and C. P. Unruh, all of Meno.

NON, OKLA.—Articles of incorporation have been filed by the Reliable Telephone Co. with $5,000 capital stock. The incorporators are: S. J. Ingram, S. H. Hamilton and H. D. Binn.

CLYDE, TEX.—Articles of incorporation have been filed by the Independent Telephone Co. with $5,000 capital stock. The incorporators are: R. J. Estes, B. C. Clemer, J. L. Tabor and others. R. J. Estes was elected president, C. L. Tyson vice-president, J. A. Kelsey secretary and treasurer.

MANGOHICK, VA.—The Farmers Union Telephone Co. has been incorporated. The officers are as follows: President, W. T. Mooklar, Mangohick; vice-president, J. O. Hutchinson, Hanover; secretary and treasurer, E. W. Fox.

SHOAL, VA.—The Shoal Telephone Co. has been incorporated with $1,000 capital stock by A. L. Scott and others.

MONTPELIER, VT.—The Newbury Center Telephone Co. has been incorporated with a capital stock of $5,000 by J. B. Tyler, M. L. Brock, A. A. Carleton, of West Newbury; William Rollins and J. F. Girge, of Wells River.

GRIFFITHSVILLE, W. VA.—The Griffithsville Telephone Co. has been organized with $5,000 capital stock. The incorporators are: F. J. Sheppard, T. B. McMellen and T. B. Barrett, of Griffithsville, W. V.; W. T. Bell, of Amy, W. Va., and M. A. Tudor, of Tango, W. Va.

INDEPENDENCE, W. VA.—Articles of incorporation have been filed by the Glade Valley Telephone Co. with $5,000 capital stock. The incorporators are: Guy E. Shaffer, Charles L. Rodgers, William G. Walls and Harvey T. Limton.

CODY, WYO.—The Marquette Telephone Co. has been incorporated with $1,000 capital stock. The incorporators are: A. J. Martin, J. F. Thompson and Lawrence Wagoner.

Construction.

PASADENA, CAL.—The Home Telephone & Telegraph Co. will make improvements to its system involving the expenditure of $260,000.

POMONA, CAL.—Architect C. E. Wolfe is receiving bids for the construction of a one-story reinforced concrete office building and exchange for the Pomona Valley Telephone & Telegraph Co. at San Dimas.

SAN DIEGO, CAL.—The San Diego Home Telephone will spend $85,000 for new equipment.

BOULDER, COLO.—The Northern States Telephone Co. has set aside $70,000 for improvements in this city.

Butler Ringing Machines

More orders are booked for Butler Ringing Machines on their performance alone than anything else which might secure business. They just **naturally make satisfied customers.** And these are "profitable advertisers" for us.

Butler Ringing Machines are fully guaranteed —sold subject to test; we are willing to let you be the judge. Fair, isn't it?

Write for Literature and Prices

Butler Electric Company
PERRY, IOWA, U.S.A.

Going to add more lines?—Going to improve your service this spring?

Then you need

Peirce Brackets

Brackets of every description and for every angle of construction—brackets that will allow of increased facilities with the least possible labor.

Hubbard Hardware—a complete and progressive line comprising the latest and best tools for every purpose.

WRITE FOR CATALOG

HUBBARD & CO.
NEW YORK PITTSBURGH CHICAGO

What they all say,
Book-keeping
is a pleasure when you use
The "Coffey System"

A few minutes daily brings the desired results automatically at the close of the month.

The Coffey System & Audit Co.
Pythian Building
New 'Phone-363 :: :: :: Indianapolis

EUREKA **Fiber Insulators and Fiber Battery Boxes**

Standard in all Telephone Work.
Neat — Convenient — Economical.
Approved by leading Engineers.

Free Samples and Specimen Card, showing four most popular types of Nails, sent on request.

EUREKA SUPPLY CO.
SEWELL, N. J.

The Acme Folding-Door Telephone Booth

is the best booth for pay stations. It is of full double sound-proof construction. The door operates without rollers, tracks or channels.

Will give ***years of service*** at ***no*** maintenance expense. ***Simple*** in construction — ***elegant*** in design and finish — ***sanitary*** and a great ***space saver. It's the booth you want to know more about.***

Write for Information

ACME CABINET COMPANY, 335 Broadway **New York, N.Y.**

Please tell the Advertiser you saw his Announcement in TELEPHONY.

ABINGDON, ILL.—E. S. Cheadle and E. S. Sterrett, who recently purchased the Mutual Telephone Co. from L. E. Cutler, are planning many improvements, including the installation of a new switchboard and underground cables.

STERLING, ILL.—The Central Union Telephone Co. is planning to build a new telephone exchange building in this city.

ADDISON, MICH.—The Addison Mutual Telephone Co. has been granted permission by the state railroad commission to construct a telephone line in Lenawee county.

HASTINGS, NEB.—The Lincoln Telephone & Telegraph Co. with headquarters at Lincoln, has decided to erect an entire new plant in this city.

BEACH, N. D.—The Golden Valley Telephone Co. is planning to make extensive improvements, including the erection of a modern exchange building.

MADISON, S. D.—The Dakota Central Telephone Co. will erect a two-story exchange building in this city. The company may also install an automatic system. George Pfeifer is manager.

NASHVILLE, TENN.—The Cumberland Telephone & Telegraph Co. will erect a new 10-story exchange building in this city, to cost about $250,000.

CARLSBAD, TEXAS.—The San Angelo Telephone Co., of San Angelo, is planning to erect a new exchange building in this city.

DALLAS, TEXAS.—A new telephone exchange is to be installed at Bowie, by the Southwestern Telephone & Telegraph Co.

GREEN BAY, WIS.—The Central County Telephone Ass'n is planning the construction of telephone lines in the towns of Waukechon, Richmond and Red Springs. The main exchange will be at Shawano.

Financial.

TAMPA, FLA.—The Peninsular Telephone Co. has doubled its capitalization, making it a million dollar concern. The company will erect a new exchange building and install the automatic system.

SLATER, IOWA.—The Slater Mutual Telephone Co. has declared an 8 per cent. dividend.

HANSKA, MINN.—The Hanska Rural Telephone Co. has declared a 6 per cent. dividend.

REDWOOD FALLS, MINN.—The Redwood Falls Electric Telephone Co. has declared a dividend of 10 per cent.

ROTHSAY, MINN.—The Rothsay Telephone Co. has declared a 12 per cent. dividend.

ST. PAUL, MINN.—The Tri-State Telephone & Telegraph Co. has declared its quarterly dividend of one and one-half per cent.

WELCOME, MINN.—The Welcome-Triumph Telephone Co. has declared a 6 per cent. dividend.

COOKEVILLE, TENN.—The Dotson Branch Home Telephone Co. has increased its capital stock from $5,000 to $10,000.

AUBURNDALE, WIS.—The Auburndale Telephone Co. has increased its capital stock from $5,000 to $10,000. R. C. Connor is secretary.

GILLETT, WIS.—The Gillett Rural Telephone Co. has increased its capital stock from $5,000 to $10,000, for the purpose of adding new lines to its system.

MILTON, WIS.—The Milton and Milton Junction Telephone Co. has increased its capital stock from $20,000 to $40,000. S. C. Chambers is president and A. S. Maxson secretary.

PRAIRIE DU CHINE, WIS.—The Union Telephone Co. has declared a 5 per cent. dividend.

WAUSAU, WIS.—The Bruckersville Farmers Telephone Co. has increased its capitalization from $1,650 to $3,300. Joseph Lamer is president and Martin Papesch is secretary.

HONOLULU, HAWAII.—The Mutual Telephone Co. has increased its capital stock from $400,000 to $750,000 for the purpose of making extensive improvements in this city.

Franchise.

AURORA, ILL.—The Inter-State Independent Telephone & Telegraph Co. is seeking a new franchise in this city to run for a period of 20 years from date of grant. The present franchise does not expire until 1919, but the officers desire a new one. In the event that this franchise is granted, the company will make extensive improvements.

CROOKSTON, MINN.—R. W. Wilder, representative of the Tri-State Telephone & Telegraph Co., at St. Paul, has filed acceptance of the franchise recently granted by the city council giving that company the right to establish long distance telephone connections in this city.

WASHINGTON, MO.—The Franklin Independent Telephone Co., has been granted a 10-year franchise to operate in this city.

Miscellaneous.

LIVE OAK, FLA.—Jas. L. Kirk has purchased the Live Oak exchange of the Florida Telephone Co. His headquarters for both the Hamilton County and the Florida Telephone Co. will be at Live Oak.

HOPE, IND.—The Hope Independent Telephone Co. has been sold to George Dorrell, of Rising Sun, Ind., for the sum of $29,000.

WARSAW, IND.—The Commercial Telephone Co. has bought out the exchange of the Central Union Telephone Co. in this city.

WYOMING, IOWA.—The Wyoming Telephone Co. has been consolidated with the Bear Creek Valley Telephone Co.

CLAY, KY.—The local exchange of the Paducah Home Telephone & Telegraph Co. in this city was completely destroyed by fire, the loss being estimated at $1,500.

WALDRON, MICH.—The Waldron Telephone Exchange has been sold to A. A. Kalder for the sum of $910.

AUBURN, NEB.—The Farmers Mutual Telephone Co., of Howe, has sold out to the Auburn Telephone Co., of this city.

NEW YORK, N. Y.—The New York Telephone Co. has purchased the Gowanda Bell Telephone & Telegraph Co. at Gowanda, N. Y., for the sum of $13,600.

LIMA, OHIO.—The Central Union Telephone Co. has been ordered by the public service commission to sell its toll lines and toll circuits in and about this city to the Lima Telephone & Telegraph Co. for a consideration of $205,000.

OAK GROVE, ORE.—The Oak Grove Telephone Co. has filed certificates of dissolution.

PHILIPS, S. D.—The Great Western Telephone Co. has sold out to the Nebraska Telephone Co., at Omaha, Neb.

BONHAM, TEXAS.—The Texas Telephone Co. has amended its charter, changing the name to the Bonham Telephone Co.

SILVER CREEK, WASH.—The Home Telephone Co. has purchased the properties of the Farmers Independent Telephone Co., in Toledo.

DURAN, NEW MEX.—The Duran Telephone Co. has purchased the holdings of the Vaughan Telephone Co. at Vaughan, New Mex.

Underground.

JACKSONVILLE, FLA.—The Southern Bell Telephone & Telegraph Co. has been granted permission by the board of county commissioners to lay its wires in conduits on Main street from the city limits at Eleventh street to Eighteenth street.

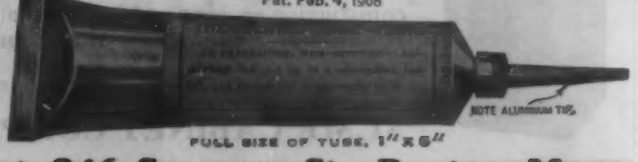
AURORA, ILL.—The Chicago Telephone Co. will expend $5,000 in extending the underground service in this city.

SHAMOKIN, PA.—The Bell Telephone Co. of Penna. contemplates considerable underground construction work in this city.

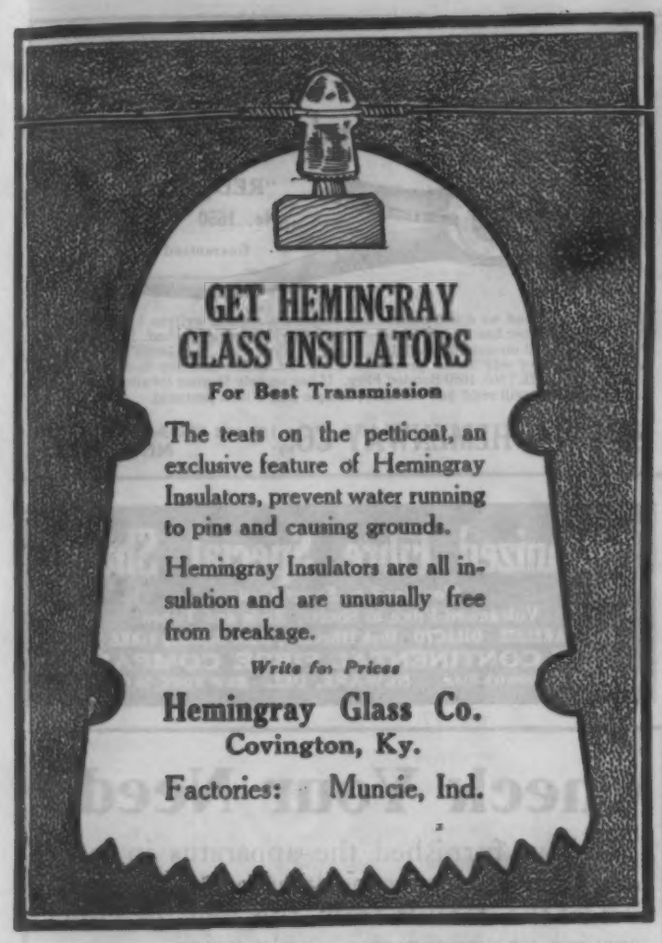
J-M TELEPHONE MATERIALS
J-M Fibre Conduit. "Noark" Fuses and Fuse Devices, Jomanco Friction Tape
J-M Phoenix Splicing Compound, J-M Guy Anchors, J-M Asbestos Roofing,
J-M Transite Ebony Asbestos Wood.
H. W. JOHNS-MANVILLE CO. New York and every large city

CEDAR POLES Prompt Shipments Write for Prices
TORREY CEDAR CO., Cincinnati, Wis.

BLAKE Specialties
STAPLES best for wiring.
TUBE FLUX best Flux for soldering.



BLAKE SIGNAL & MFG. CO. Write for Samples **246 Summer St., Boston, Mass.**



GET HEMINGRAY GLASS INSULATORS

For Best Transmission

The teats on the petticoat, an exclusive feature of Hemingray Insulators, prevent water running to pins and causing grounds.

Hemingray Insulators are all insulation and are unusually free from breakage.

Write for Prices

Hemingray Glass Co.
Covington, Ky.

Factories: Muncie, Ind.

Don't Dally with Danger

or painful injury, by trying to locate "trouble," handling wires or doing any electrical work or investigation unless your hands have adequate protection.

A heavy glove is not necessary. There's a wonderful new work glove that every lineman and electrical worker should know—the

Grinnell REZISTOL "Rist-Fit" Glove

made of leather, light, soft, smooth fitting, and very pliable, but tough as rawhide and without equal for long service. It will outwear two or three pairs of ordinary gloves.

"Rezistol" leather, subjected to a "High Voltage, break-down test" by a well known testing engineer did not puncture below 4,000 volts.

Why clumsy, costly, short-lived rubber, with its endless expense, when **Rezistol** Gloves may be had at almost any dealer's, at a very modest price?

Catalog on request, with a sample of "Rezistol" leather, and our "Pair-on-Approval" offer. WRITE!

Morrison-Ricker Mfg. Co.
Established 1856
133 Broad Street Grinnell, Iowa

The Bierce Anchor

One solid piece. Will not creep.
When the best is also the cheapest.
Where is the argument?
Let's get acquainted.

The Specialty Device Co.
CINCINNATI, OHIO

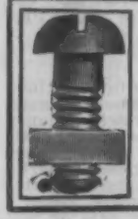
"MANSBRIDGE" TYPE, TELEPHONE CONDENSERS

embody all the essentials of long life and good service. *Write for Literature*

ELECTRIC SPECIALTY CO.
Cresco, Iowa

We inspect and test all kinds of Electrical and Transportation Machinery and Apparatus.

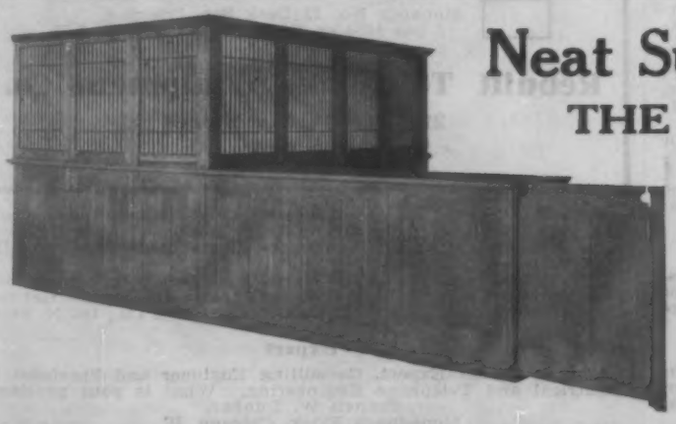
THE TRANSPORTATION EQUIPMENT INSPECTION BUREAU
AFFILIATED WITH THE
WIRE INSPECTION BUREAU
Hugh T. Wreaks, Secretary, 80 Maiden Lane, New York
Prices on Request Correspondence Solicited



BOLTS

Of every description for telephone construction. Besides we make screws, nuts and pole line hardware. Hot or cold galvanizing. Prompt shipments. Write mentioning *TELEPHONY*.

ROCKFORD BOLT CO., 20 RUBY STREET ROCKFORD, ILL.



Neat Substantial Inexpensive

THE BROWNELL SYSTEM

of Interchangeable Unit Office Fixtures

Shipped knocked-down and assembled with a screwdriver.
All styles of telephone booths.

Send for Catalog

C. H. BROWNELL
PERU INDIANA

Classified Advertisements

Classified Advertisements in "TELEPHONY" cost 5 cents per word—minimum number of words per insertion, twenty. Cash should accompany order. Advertisements in black face type, 10 cents per word. No advertisements accepted after Thursday.

Equipment For Sale

"REBUILT" TELEPHONE APPARATUS and exchange equipment saves you 30 to 50 per cent without sacrificing quality or efficiency.

SWITCHBOARDS —Telephones—Apparatus — Protection Equipment—Cable—Everything you need for the installation and operation of a complete exchange—Magneto or Central Energy—of the best and most reputable manufacturers.

SIX YEARS SUCCESSFUL OPERATION of our "Rebuilt" Equipment Department puts it past the experimental stage. Quality and price will make you a permanent customer. Better investigate.

Ask for Our Free No. 78 Bargain Bulletin

Address

"Rebuilt" Equipment Department

PREMIER ELECTRIC COMPANY

CHICAGO, ILL.

"REBUILT" when connected with PREMIER means something

Help Wanted

WANTED—Will take partner in telephone business either salary or profit sharing basis to suit any one interested, to join in building new lines. No competition. And to operate existing lines in connection I have best toll line proposition. I know of about ten towns needing exchanges. Some money necessary. Address: Lake Shore Telephone Co., Grand Marais, Minn.

WANTED—A first class wire chief for Kellogg common battery exchange. Must understand construction. Married man preferred. Only man who can make good need apply. Waste of time for others. Salary $75 per month. Address: Carroll County Ind. Telo. Co., Savanna, Ill.

WANTED—A practical, competent telephone man, 15 years' experience in every branch of business, now holding responsible position with one of the largest concerns, wants to get back into the operating field; will invest $1,500 in a good exchange where services as manager will pay at least $100 a month. Thoroughly competent in every department and the man you are looking for to get results. Must be a good company and in a good town. The very best of references. Write giving full particulars. Address: 1452, care TELEPHONY.

WANTED—At once—man and wife to operate and care for small exchange. Address: W. F. Johnson, Harvard, Nebr.

WANTED—Young lady to organize operators' school and take charge as instructor. Address inquiries to Citizens Independent Telo. Co., Terre Haute, Ind.

WANTED—Two men; wire chief must know common battery switchboard work and circuits. Also a first class lineman and construction man, no other than sober men who can furnish references need apply. The Sidney Telephone Co., Sidney, Ohio.

WANTED—First class trouble man and manager, magneto plant, 300 phones, Iowa, position permanent. Advise first letter age, experience, salary and references. Address: 1455, care TELEPHONY.

Plants For Sale or Exchange

FOR SALE—Telephone plant for $1,500, except $300 interest held locally. 60 telephones, 7 miles rural line; new construction; good cedar poles, shaved and painted. 600 population in growing county seat; undeveloped territory; 25 year franchise. Rates, $1.50; residence, $2.50; business country, $2 to $4 per month. Good chance for toll line. You can't get the merits of the business by writing, if you want it, come and see. It's worth three times what I ask. Address: Lake Shore Telephone Co., Grand Marais, Minn.

FOR SALE OR EXCHANGE—Telephone plant for sale or will exchange for good unencumbered North Dakota or Musselshell Valley, Mont., land. Exchange located in first class North Dakota farming community; over $10,000 spent in 1911 in thoroughly repairing entire system; excellent opportunity to extend business. Address Box 486-B, Fargo, N. D.

Positions Wanted

WANTED—Position by an all around man, 15 years' experience, can handle any branch of the business. References given. Address: 1454, care TELEPHONY.

WANTED—Position as manager or troubleman of small plant or as cable splicer in some larger plant. Address: 1453, care TELEPHONY.

WANTED—First class telephone man desires to invest $1,000 in a magneto plant where he can act as manager. Address: 1456, care TELEPHONY.

Poles

WHITE CEDAR POLES: Produced from our lands. All sizes. Prompt shipments. May we have your next order? Write for quotations. Kaye & Carter Lumber Co., 727 Lumber Exchange Bldg., Minneapolis, Minn.

Miscellaneous

WET CABLE TROUBLE—If the wet spot can be located without cutting the cable the Wireless Cable Tester will do it. Sent on trial. Address, Electric Spec. Mfg. Co., 426 Granby St., Cedar Rapids, Iowa.

Two Years' Continuous Service

IS GUARANTEED THE USER OF THIS

"Red Devil" Bonded Side Cutter

"RED DEVIL"
No. 1650 "Bonded Plier"
Guaranteed for 2 years

We say bonded and we mean bonded and we place a regular written bond in each box so that the user has a genuine "come back" if the tool does go bad. But it won't. No need to dwell on quality, workmanship or finish of this "Red Devil" Tool. It's guaranteed every way for a period of TWO YEARS. Ask any dealer to show you "RED DEVIL" No. 1650 Bonded Plier. If not on sale in your locality yet send us $1.75 and we will send you one only, sample pair 8 inch postpaid.

SMITH & HEMENWAY CO., 150-152 Chambers Street NEW YORK

Vulcanized Fibre Special Shapes

Machined to Exact Gauge

Vulcanized Fibre in Sheets, Rods and Tubes

BAKELITE - DILECTO High Efficiency, Water Resisting FIBRE

THE CONTINENTAL FIBRE COMPANY

CHICAGO, McCormick Bldg. NEWARK, DEL. NEW YORK, 26 Cortlandt St.

Check Your Needs

We have furnished the apparatus in large quantities—have rebuilt it and you can't detect the rebuilt from the new in either service or appearance—only price.

Kellogg No. 2696 compacts bridging, 3 bar generator, 1600 ohm ringer	$5.60
Kellogg No. 2696 compacts 4 party, 3 bar generator, 2500 ohm ringer	5.60
Baird (new) midget compacts, equipped with Kellogg transmitters and receivers, bridging 3 bar generator, 500 ohm ringer	6.00
Same make bridging 5 bar, 1000 ohm ringer	7.85
Stromberg-Carlson No. 104 compacts equipped with No. 7 B transmitter and No. 3 receiver, bridging 3 bar generator, 1000 ohm ringer	5.25
Same make, bridging 3 bar generator, 1000 ohm ringer	7.25
American Electric Co., No. 36, Bridging 5 bar generator, 1000 or 1600 ohm ringer	7.00
Am. Elec. No. 36, bridging 3 bar generator, 80 ohm ringer	4.25
Monarch No. 22 Desk set, bridging, 3 bar 1000 ohm ringer	6.00
Monarch No. 22 Desk Set, bridging, 5 bar 1600 or 2500 ohm ringer	7.75

Rebuilt Telephone Equipment Co.

2127-2129 W. 21st Street

Chicago

MOON CABLE TERMINALS are made right in design and quality. They are easily and quickly installed. Do away with cable trouble—use Moon Terminals. Write Moon Mfg. Co., 120 N. Jefferson St., Chicago, Ill.

TELEPHONE PAY STATION SIGNS—Finest porcelain enamel. Practically indestructible. Retain true colors and finish. Get the ones with the reputation. Burdick Enamel Sign Co., 166 N. State St., Chicago, Ill.

Expert

I am a Patent Expert, Consulting Engineer and Specialist in Electrical and Telephone Engineering. What is your problem?
Francis W. Dunbar,
Monadnock Block, Chicago, Ill.

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Auditing, Accounting
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WARNER POLE CHANGERS

Do More Towards Improving Your Service Than Any Other Device on the Market

Most of the telephone companies have found this out—the fact that 17,000 are now in actual service is the best recommendation for Warner Pole Changers. The apparatus is sturdy and requires absolutely no attention. The Warner Pole Changer is very neat and can be kept in an office as the operation is silent. All parts readily accessible for inspection.

Write for prices and particulars at once

WARNER ELECTRIC CO.
MUNCIE, IND.

Advertising Comes High

—and the best advertisement you have is Mr. Satisfied Subscriber—so hang on to him—or better get more "best ads."

We could cite you numerous cases in which the subscriber figures as an ad—he does every time he comments on your phone or your service.

Chicago subscribers—or people using *Chicago* telephones—are satisfied; they are good live ads—for us—and for you.

Write for "Making Good"—a little book written to show you how to *satisfy your subscribers*—and greatly improve *your service* at a saving—yes, it's possible; write and see.

Do you know of our Free Trouble Insurance Policy, which legally binds us to pay all trouble expense Chicago phones incur? Information on request.

CHICAGO TELEPHONE SUPPLY COMPANY
ELKHART, INDIANA

MILLIONS Of Dry Cells Are Handled In This Territory

FRENCH Telephone Cells

Are Manufactured and Shipped
Direct from Madison, Wis.

There is no reason why the dry cells *you* use should get old in transportation and stock rooms before you install them.

Your orders will be shipped the day received.

Send for new price schedule.

FRENCH BATTERY & CARBON CO.
Madison, Wis.

TELEPHONE WIRE

We Guarantee
Greatest Efficiency
Longest Life
Most Satisfactory Service
Lowest Cost of Up-keep
In the Use of our wire.

Write for FREE SAMPLE Make Test and Comparison

Approved by Leading Institutions of Technology and Telephonic Science. Handled by most representative Jobbers and Supply Houses.

Indiana Steel & Wire Co.
Muncie, Indiana.

REMEMBER

Chapman Lightning Arresters

will not rust out or be shot full of holes by the end of the season. Their construction makes them as permanent as the pole line.

Get your orders in early and avoid delay.

MINNESOTA ELECTRIC COMPANY
Minneapolis, Minn.

THE ALLEN SODERING STICK PREFERRED BY ALL

At your dealers— or send us 20c and his name

Telephone companies now using the Allen Soldering Stick prefer it because it makes sound joints; it improves the transmission; it reduces the time necessary to soder a joint.

The lineman prefers the Allen Sodering Stick because it is easy to use, easy to carry and assures him of a good joint every time.

TO GET A PERFECT JOINT: Heat it, rub it lightly with the Allen Soderng Stick and apply your soder.

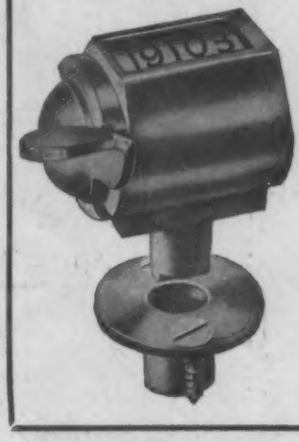
L. B. ALLEN CO., Inc., 4578 N. Lincoln St., CHICAGO
Branches: New York, Winnipeg, San Francisco and Portland

As a Trial Order

get just enough arresters to equip your heaviest rural line. That will be enough to convince you that our system of protection is RIGHT.

We can interest you when it comes to protection. Write us.

Metallic Lightning Arrester Co.
Lewiston, Minn.



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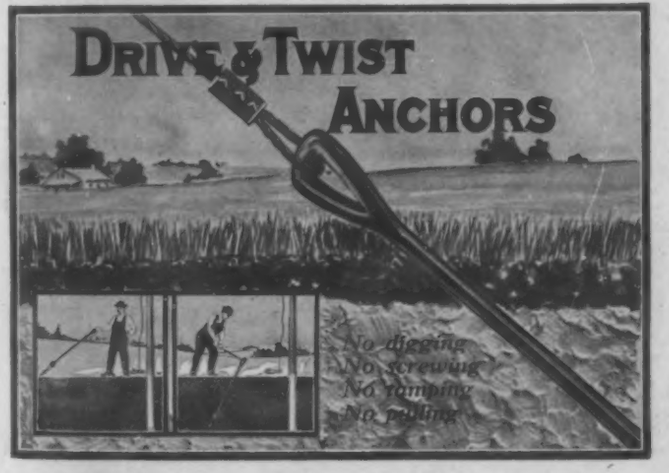

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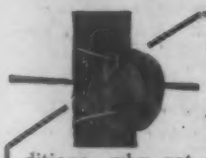

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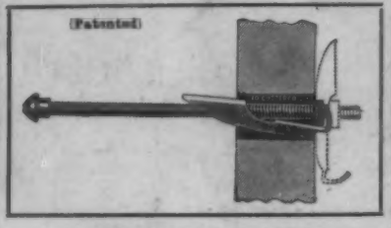

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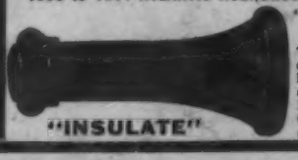

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